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ANTIBIOTICS

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IT is not surprising, perhaps, that the microbes producing the known antibiotic substances are soil bacteria, or that the intensive search for new antibiotics centres largely in the soil. It has been recognized since the early days of bacteriology that enormous numbers of animal pathogens which return to the earth's surface do not usually survive very long, and that their destruction is brought about by the normal soil bacteria. This is shown by the fact that many pathogens will grow readily in sterilized soil, but will not live very long in fresh soil.

Historically, the first antibiotic substance recognized as such was pyocyanase, produced by the organism of "blue pus". This was described in 1899. From the standpoint of therapeutics, the subject began in 1929, with the discovery of penicillin. Of the large number of bacterial inhibitors now described, three have become of practical importance in medicine. One of these, tyrothricin, which can be resolved into the two fractions gramicidin and tyrocidin, has proved too toxic for intravenous use, although it has recovered some popularity since topical application of these materials began to be widely used. In this discussion, then, only penicillin and streptomycin will be considered.

PENICILLIN

The first important discovery, in what was to become so rapidly the biggest therapeutic plum in medical history, was made in 1929 by Sir Alexander Fleming. A chance contamination of a culture by a mould, subsequently identified as *Penicillium notatum*, was followed by obvious lytic changes in the bacteria. The active principle responsible for this, a metabolite of the mould, is penicillin. Fleming did not isolate enough for therapeutic use: that remained for

Florey's group at Oxford. He did, however, use the crude dilute solution as an ingredient in culture media to inhibit the growth of penicillin-sensitive bacteria in mixtures, and so to facilitate the isolation of those, like *Hæmophilus influenzæ*, which resist its action. Cruickshank has recently demonstrated its value in culture media in the isolation of *H. pertussis*, and it has been used to isolate pure cultures of *Trichomonas vaginalis*. In similar fashion we have utilized its therapeutic effect on cases of intrinsic bacterial allergy to confirm or deny the incrimination of a particular microbe.

Commercial penicillin, in the form of the sodium or calcium salt, is 1/3 to 1/2 active principle, the remainder being impurities which impart the colour and probably give rise to some of the hypersensitive reactions currently described. Pure penicillin is a white powder, less bulky, crystallizable, and gives a colourless solution. The active principle itself is not a single substance, and according to the method of culture, one or other of the fractions will predominate. Surface culture, the oldest commercial method, will yield mostly penicillin F, for example, while deep culture will give predominantly penicillin The chemical structure of penicillin was recently revealed as C9H11O4SN2. R. The radical R is the sole difference between the penicillins characterized as F, G, X and K. Therapeutically these fractions are interchangeable. Tested on certain bacteria the effect is practically identical, on others there is a quantitative difference.2

Bacteriological considerations. — In listing pathogenic microbes in the order of their tolerance to penicillin, distinction was made early between those which were sensitive and those which were resistant, with the division drawn roughly on the basis of susceptibility to the blood levels of antibiotic normally found in patients. Cocci in general are inhibited readily, the Neisseria most easily, and then in order

pneumococcus and the hæmolytic streptococcus of human disease. Staphylococcus is definitely more resistant, as is *Strep. viridans*. As is well-known, the latter organism and the infections to which it gives rise have only recently been transferred to the list of treatable diseases, since large supplies of penicillin became available. Gonorrhæa may respond to 100,000 units given in 24 hours, subacute endocarditis may require 50,000,000 units over six weeks or more. It is of value to recognize a time-concentration relationship; some microbes will require much more penicillin than others, and maintained for a longer period of time.

Also within the range of possible therapeutic action will be most strains of sporulating pathogens of the anthrax and gas-gangrene types, the diphtheria bacillus and Actinomyces hominis. It should be emphasized, however, that despite a recent publication of an effect of penicillin on meningococcus endotoxin, this treatment alone will not suffice in the face of well defined bacterial toxins. It is clear that gas-gangrene still requires surgery and antitoxin, and diphtheria and tetanus antitoxins are still essentials.

Gram-negative bacilli of the typhoid-colidysentery group, the influenza bacillus, and the undulant fever and tularæmia organisms do not respond to penicillin. Even with these however, there is considerable strain variation in tolerance, and recently McIntosh described a case of H. influenzæ meningitis which responded to penicillin and sulfonamide. Less convincingly, a case of Friedländer's bacillus pneumonia has been described as cured with penicillin. Important in this list of resistant microbes is the tubercle bacillus.

Clearly, in the intelligent use of penicillin, a bacteriological diagnosis is a prerequisite. This should include an assay of the sensitivity of the organisms concerned, for not only is there natural strain variation in resistance to penicillin, but resistance may develop during the course of therapy. This suggests the employment of maximal doses at the outset to obviate this. While the basis for induced resistance is not known, natural resistance appears to be associated with possession of penicillinase. The control of an organism possessing this enzyme is much like the problem of controlling a penicillin-sensitive microbe in mixed infection with penicillinase-producing coliforms. Streptomycin is of great value in that elimination of the latter is often a prerequisite to successful exhibition of penicillin.

Administration of penicillin. — The systemic effect lasting about three hours after intravenous or intramuscular injection is well known. the clinical success of penicillin became increasingly evident, the tedium for patient and hospital staff alike of eight injections a day assumed greater proportions, and recent work has been directed towards minimizing the inconvenience. Roughly 60% of the injected penicillin is excreted in the urine, and retention in the blood and tissue fluids is consequently favoured by cardiac failure, renal insufficiency, and the renal dysfunction which may accompany hæmorrhage. On this same principle, blocking the kidneys with diodrast or p-amino hippuric acid, has been shown to prolong the blood phase following a single injection.

A more feasible method of reducing the number of daily treatments is to slow the rate of absorption by incorporating the penicillin in a mixture of peanut oil and beeswax, as introduced by Kirby. This is physiologically similar to the continuous intravenous or continuous intramuscular procedures, but without the risk of thrombophlebitis with the one, or the painful muscles with the other. Attracting attention at present are the numerous efforts to achieve a regularly reliable preparation for oral administration. Adequate blood levels can be achieved by giving by mouth 4 or 5 times the parenteral dose. Many vehicles have been used to buffer the gastric juice3 without significantly increasing the proportion of penicillin absorbed from the gut. Oral penicillin will play a major rôle in the future of this antibiotic. In respect of the many unsolved problems concerning its absorption from the gut, it is of interest that Loewe recently demonstrated that penicillin is absorbed from the rectum.

As Fleming has said, therapeutic success will be commensurate with the degree of ingenuity exercised in applying to the bacteria in the tissues an adequate concentration of penicillin, and it is well known that penicillin circulating in the blood does not distribute itself uniformly throughout the body. It exhibits marked difficulty in penetrating abscess walls, to a degree corresponding with the nature and thickness of the barrier. In empyema, therefore, sterilization of the pus will require introduction of penicillin into the cavity. This may not avert the need for surgery in the interests of a func-

tioning lung although a comparable abscess in the subcutaneous tissues may be resolved with penicillin alone. In these circumstances it is evident that absorption from such abscess cavities will also be slow, and renewal of the drug need be carried out only daily or on alternate days, in amounts dependent on the nature of the infecting bacterium. For similar reasons of inadequate diffusion it may be necessary to give penicillin intrathecally in meningitis in daily or twice daily doses for adults of 10,000 units. Sinus infections pose a like problem, and to achieve an adequate concentration, penicillin must be introduced either by the displacement method of Proetz, or by puncture. It has been stated that solutions stronger than 500 units per ml, damage ciliated epithelium, but in our own studies ciliary action was well-maintained in solutions several times this strength. Allowing for dilution by exudate, and progressive absorption, we have experienced no untoward clinical results in using solutions containing 5,000 units

Penicillin may be driven by iontophoresis into the eye. It may be applied topically in an ointment base to burns and other superficial lesions. The chief problems in this matter of topical application are firstly the devising of a base in which the penicillin will remain active for a reasonable time, and from which it will be delivered to the tissues. Secondly, the drug is absorbed so quickly from surface lesions of all sorts, that the maintenance of an adequate concentration locally is inconsistent with the modern surgical concept of infrequent dressing changes. In all, topical (as distinct from systemic) use of penicillin in burns and trauma is one of its less dramatic virtues.

The respiratory tract has offered plenty of scope for ingenuity in local therapy. Lozenges containing usually 1,000 units of penicillin have proved of great value in controlling infections such as Vincent's in the oral cavity. There is evidence, however, to show that salivary currents prevent the access of drugs so introduced from passing beyond the anterior pillar of the fauces. In bronchiectasis and lung abscess penicillin has been inhaled in ærosol form. However, such therapy must be carried out four or five times daily, and it has been suggested that a better method of introduction is in suspension in iodized oil.

Clinical value of penicillin.—The most dramatic results are seen in acute infection with

penicillin-sensitive organisms. Such conditions are gonorrhea, bacteriæmia due to Lancefield A. streptococcus, staphylococcus and pneumococcus. The present view that sulfonamides frequently offer equal satisfaction fails to recognize that for many of these fulminant infections there was little or nothing could be done in prepenicillin days. It is true that sulfadiazine gives a more prompt response without the inconvenience of systemic and intrathecal therapy in meningococcal meningitis, but the relative ineffectiveness of sulfa drugs in pneumococcal, staphylococcal and streptococcal meningitis leaves penicillin the drug of choice, or at least an indispensable adjunct to sulfadiazine.

In pneumococcus pneumonia Tillett et al. reported a fatality rate of 6.5% with penicillin, which compares very favourably with either sulfonamide or specific serum therapy. Furthermore, penicillin is effective on sulfa-resistant pneumococci, and purulent complications such as empyema are very uncommon. If oral penicillin therapy proves economically and therapeutically reliable, it may considerably supplant sulfonamides in the treatment of pneumococcus pneumonia. One limitation may well be observed frequently in such cases. It is well-established that auto-immunization during the course of pneumonia does not manifest itself until the fourth or fifth day of disease, and that this effect requires a minimum number of pneumococci. The bacteriostatic effect on the organisms may be sufficiently complete to prevent the minimum antigenic stimulus. This effect may be the explanation of the occasional relapse in pneumonia under penicillin therapy, and is evidence of a more complete bacteriostasis than sulfonamides produce.

Penicillin has proved a valuable supplement to surgery. Acute osteomyelitis may respond to penicillin alone if treatment is begun early in the course of disease. Sterilization of the lesions in chronic osteomyelitis is usually impossible however, and sequestra must be removed surgically. In trauma, surgical management of the damaged tissue is far more important than chemotherapy in the prevention of infection, and prophylaxis or therapy of gas gangrene and tetanus still require antitoxin.

A number of problems are the subject of current inquiry. Prominent among these is syphilis. It might be well to reserve final judgment for some years, but it seems probable that 75% or more of cases of primary and secondary

syphilis may be controlled with a dosage of the order of a million units given over a week.

As distinct from the treatment of manifest disease, control of the "carrier" is a problem of the greatest importance. There is some doubt as to the value of penicillin in eliminating the diphtheria carrier, but there is convincing evidence that for the first time the hæmolytic streptococcus carrier can be rendered free.

Toxic reactions.—It appears inevitable that the introduction of new chemotherapeutic drugs should be accompanied by the statement that they are undoubtedly non-toxic. Penicillin was so described, and no serious or permanent harmful effects have been recorded. Moreover, within the past year Loewe indicated his disbelief in the development of sensitivity in describing 27 patients under intensive and prolonged treatment for subacute endocarditis. One patient received a total of 112,620,000 units of penicillin over a period of 230 days. None of them developed sensitivity to the drug.

Lately it has become apparent4, 5 that 2.5% of treated patients develop urticaria, which may manifest itself on the first day of treatment, or may be delayed for some days after the end of the course. Marked dermatographia may accompany the condition. A second type of response is the vesicular or papular eruption most often noticed in the webs of fingers and toes and in the crural region. It has been suggested that this is associated with fungus infection of the skin as an "id" reaction. Probably similar in origin is the Herxheimer reaction noted fairly frequently in the treatment of syphilis. These reactions rarely require discontinuance of penicillin, except in cases where asthma is the manifestation of sensitivity, as described by Price.6

These side reactions are due in part to the considerable amount of impurity present in commercial penicillin. The same is true of the discomfort following intramuscular injection, the thrombophlebitis at the site of a continuous intravenous needle, pyrogen reactions and occasional abdominal cramps.

STREPTOMYCIN

With the discovery of streptomycin in 1944 Waksman brought to fruition years of antibiotic research. Produced during the growth of Streptomyces griseus, this substance is a water-soluble, nitrogenous base, usually commercialized as the hydrochloride. Streptomycin achieved immediate success through its ability to cure in-

fections not influenced by penicillin, though it must be confessed that the substance has been more publicized in the lay press than in official medical journals. The literature on it is not as abundant as that on penicillin.

Bacteriological considerations.—Streptomycin is the first known substance exerting an adequate, specific effect on Gram-negative bacteria. These include Escherichia, proteus, hæmophilus, pasteurella and the organisms concerned with intestinal disease. In vitro tests indicate even greater sensitivity on the part of Gram-positive microbes, though how far streptomycin may replace penicillin in this respect remains to be seen. The tubercle bacillus is sensitive in vitro to streptomycin, with much attendant publicity.

There is wide variation among the various bacterial species, and among the strains of any one species, in tolerance to streptomycin—a fact to be considered in estimating dosage. Bacteria may develop resistance to streptomycin, both in vitro and in vivo, with surprising speed, emphasizing the wisdom of high initial dosage.

Streptomycin is not destroyed by bacterial enzymes, and can indeed be invaluable in controlling the penicillinase-producing organisms in mixed infection, to give penicillin the necessary opportunity. In this connection, these two antibiotics are not incompatible. On the contrary, they may be employed simultaneously.

Administration.—Streptomycin may be given by all the routes employed for penicillin, with the sole exception that it is not absorbed from the gut. It diffuses only in small amounts into the cerebrospinal fluid in normal subjects, but to a greater degree when the meninges are inflamed. It is concentrated to some extent in the bile, and infinitely more so in the urine. Topical application must be resorted to in sinus infection, and inhalation in ærosol form is a useful supplement in disease of the lower respiratory tract.

The blood level is maintained slightly longer than with penicillin, and this is reflected in a more prolonged urinary output, so that intramuscular injections every four or even six hours may be adequate. Evidence of hypersensitivity is lacking at present, but more local muscular discomfort is usually experienced than with penicillin, although this is not marked and soon passes away. Repeated use of the same region gives no greater soreness, and the two deltoids and both gluteal regions can satisfactorily be used in turn. Intravenous administration is at-

tended by some tendency to thrombosis. Febrile reactions have not been stressed, but in one of our cases a temperature of 102°, with chills, twice followed the intramuscular injection of one particular batch, although the same patient tolerated perfectly another batch for eight days. Presumably, therefore, some of the sequelæ, which may become more frequent as the drug is more freely available, are due to impurities.

CLINICAL VALUE OF STREPTOMYCIN

Streptomycin has been most widely used in acute urinary tract infection. The causative organisms are generally coliform species, and are correspondingly resistant to penicillin. No previous therapy could offer the prompt, permanent sterilization of the lesions which streptomycin achieves. There is evidence of clinical value in tularæmia, typhoid fever, and infections with Friedländer's bacillus.8 In our experience, topical use of streptomycin has been particularly effective in abscesses and infections, as in sinuses or in the peritoneal cavity, where adequate drainage is difficult. The evaluation of streptomycin in the treatment of tuberculosis, despite much premature speculation, needs time. However, the antibiotic has a marked effect on the tubercle bacillus in vitro and in the guinea-pig, and human clinical trials are in progress.

Streptomycin is a valuable partner to penicillin, and will be followed by still other materials of similar origin. One might echo something of the sentiments expressed by Keefer⁴ and seek for agents effective in virus diseases and against moulds and fungi.

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ANTIBIOTICS USED LOCALLY IN SINUS INFECTIONS

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CLINICALLY we have had great success with the topical use of antibiotics in the nose. By means of the displacement method of Proetz, the various antibiotics in solution have been tried, and the results appraised. Subacute sinusitis and cases with an acute exacerbation of a chronic sinusitis seem to respond best to this form of treatment.

The displacement method described by Proetz in 1926 has been used routinely in these cases. When Proetz recommended this form of treatment, he suggested a solution of ½ to 1% ephedrine hydrochloride as a shrinking agent. He maintained that on shrinking the nasal mucous membrane most cases of uncomplicated sinusitis would clear up when ventilation and drainage were established. By displacement, Proetz meant displacing the air so that solution instilled into the nostrils partially filled the sinuses and thereby acted on a greater surface.

In this method the patient is instructed to lie flat on his back with the head hyperextended over the end of the table so that the chin and the canal of the ear are vertical. Three or four c.c. of ephedrine hydrochloride in saline are instilled into one nostril and suction applied to the same nostril from a rotary pump, the other nostril being held closed. The nasal tip should fit snugly and the suction not exceed 180 mm. of mercury. The patient is asked to repeat the letter K in order to close the nasopharynx. In this way bubbles of air are removed by suction from the sinuses allowing the solution to enter these cavities. Intermittent suction is exerted about 10 or 12 times and another e.c. of solution instilled. The other nostril is treated in the same way. When the patient sits up very little solution enters the pharynx as most of it is retained in the sinuses. This is easily shown by using lipiodol which remains from one to three days in the sinuses.

At times it is not convenient for patients to report to the office every two days for treatment. In many of these cases, a suction bulb connected to a nasal tip by a short length of rubber tubing is very useful. Portable suction bulbs, it is true, cannot keep up a continuous suction but they

[&]quot;Medicines are nothing in themselves, if not properly used, but the very hands of the gods, if employed with reason and prudence."—Herophilus.

are effective, as it is only necessary to remove a few bubbles of air at a time.

We have found a four-ounce hard rubber bulb very satisfactory. A small concave finger valve about an inch from the bulb can be easily covered by the ball of the thumb when suction is required. A bulb such as is shown in Fig. 1

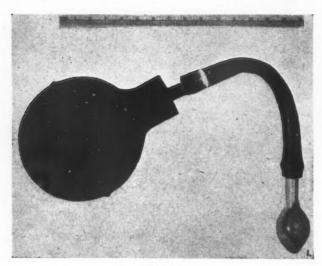


Fig. 1

works well in hospitalized patients and parents can easily be instructed in its use for children with sinusitis at home.

Not all chemotherapeutic agents act to the same degree. For instance, there is very little absorption of the sulfa compounds in solution from an intact swollen mucous membrane and many rhinologists think that any beneficial result from their use is due in great measure to the shrinking agent present. On the other hand sulfa powder or solution in an open wound seems to inhibit the growth of organisms. Better results are obtained in acute sinusitis when the predominating organism is Gram-positive, if the sulfa compound is taken by mouth. Gramicidin (tyrothricin) as the name implies acts on Grampositive organisms locally but is too toxic to be injected. To be effective, tyrothricin has to be in intimate contact with bacteria. Theoretically it acts on Staph. pyogenes, pneumococcus and streptococcus and as the majority of upper respiratory infections are caused by these organisms, great hopes were held out in its use. It is also more stable than penicillin and is not affected to the same degree by changes in temperature. However, in our hands the results by the displacement method have been much less encouraging. On the other hand, penicillin locally has been very successful against Grampositive organisms.

Penicillin in solution remains in contact with infected mucous membrane for at least a day or two when used in displacement.

Our procedure for the past year in cases of subacute and chronic sinusitis is to take a swab from each middle meatus and the nasopharynx. If the bacteriologist's report shows a predominance of *Staph. pyogenes*, streptococcus or pneumococcus, a course of penicillin therapy is given by the displacement method. The head is hyperextended as mentioned and turned to the right when this side is treated, so that the solution spreads high up over the lateral wall where the openings of the sinuses are situated (Figs. 2 and 3).



Fig. 2.—Diagram of the lateral wall of the nasal cavity showing the openings of the sinuses. These are all located in the upper half of the nose.

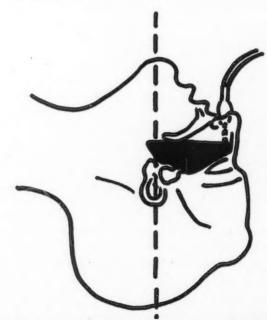


Fig. 3.—Showing the head in the Proetz position. Instilled fluid fills the upper part of the nose and covers all the sinus openings.

Pneumococci in pure culture are destroyed very quickly, usually in about 48 hours so that only two treatments are necessary. Staph. pyogenes and streptococcus are more resistant and require four or six treatments at 48 hour intervals. Repeated swabs show when the cultures are sterile. If the offending organism is suitable for a vaccine, this is, of course, given at the same time. In this way many severe cases have been cleared up which did not respond to other forms of treatment.

In the same way we have had good results with streptomycin when the predominating organism isolated from the nose or nasopharynx showed B. influenzæ, Friedländer's, B. coli or other Gram-negative rods. Streptomycin is much more stable than penicillin and less irritating to the nasal mucous membrane. Although many sinus infections on culture show certain germs in pure culture, the great majority are due to a mixture of various organisms. For instance, sinusitis showing pneumococci and B. influenzæ would only be partially helped by penicillin. The pneumococci would be destroyed by two or three displacement treatments using 5,000 units of penicillin to 1 c.c. of sterile saline. However, the B. influenzæ being Gram-negative would not be acted upon. But an infection such as this would in all probability respond to displacement, using streptomycin. For the last few months, we have been mixing penicillin and streptomycin in equal parts and have been gratified with the results.

Penicillin is an acid and streptomycin a base but they mix well and in a mixture both are effective. It is questionable whether in future it will be necessary to take a preliminary swab to determine the cause of infection. Perhaps it will be sufficient to culture the nasal swabs only after a series of displacements have been carried out with these materials.

THE PROLONGATION OF LIFE.—"This is a new part of medicine, and deficient, though the most noble of all; for if it may be supplied, medicine will not then be wholly versed in sordid cures, nor physicians be honored only for necessity but as dispensers of the greatest earthly happiness that could well be conferred on mortals."—Bacon, The Advancement of Learning.

THE TREATMENT OF ACUTE AND CHRONIC PULMONARY DISEASE WITH PENICILLIN ÆROSOL*

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THE inhalation of various ærosols, such as adrenalin, has been used in the treatment of broncho-pulmonary disease for a number of years. It was not until 1944 however that Bryson et al.¹ suggested that the inhalation of penicillin, in the form of a nebulin or ærosol, should be a logical addition to the methods of administering this antibiotic in the treatment of respiratory disease. They proved that a penicillin ærosol penetrated into the alveolar portion of the lungs of rabbits and that, both in rabbits and man, up to 60% could be recovered from the urine within 12 hours of its inhalation.

The following year Barach and his co-workers,2 having demonstrated that such inhalations were not injurious to the lungs of rabbits, essayed its use in man and showed that after the inhalation of from 20,000 to 70,000 units of penicillin blood levels of from 0.01 to 0.18 units per c.c. of blood could be obtained. Twenty cases of various pulmonary diseases, including asthma, chronic bronchitis, bronchiectasis and lung abscess, were treated with approximately 200,000 units of erosolized penicillin daily. It was found that all penicillin-sensitive organisms would disappear from the sputum for at least 24 hours after discontinuing the inhalation. Marked improvement occurred in some of these cases with the cure of one patient with a lung abscess.

Olsen^{3, 4} has used this form of therapy extensively in the preoperative management of bronchiectasis and also therapeutically in those unfit for operation and has had excellent results in 50% of his patients, the success or failure of the treatment being dependent upon the bacteriology of the sputum.

Within the last few months Segal and Ryder⁵ have reported a further series of cases treated with penicillin ærosol in doses of 15,000 to 30,000

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units every two to three hours. In addition to excellent results in several cases of lung abscess and bronchiectasis they demonstrated that it was effective in the treatment of lobar pneumonia.

From these reports it is apparent that the use of penicillin ærosol is fast becoming a valuable addition to our methods of treating acute and chronic broncho-pulmonary disease. The evaluation of its rôle in the treatment of these diseases is still incomplete and can only be established by its widespread clinical use. With the purpose of aiding in this objective this investigation was undertaken.

PLAN OF TREATMENT AND APPARATUS

It was decided to standardize the dose and time of administration, and so all patients were given 25,000 units of ærosolized calcium penicillin* every three hours, night and day. It is not known how long penicillin remains in the lungs after inhalation but it has been shown that blood levels can rarely be measured at the end of two hours.⁵ It was felt that the three-hour interval should maintain a fairly constant bactericidal effect in the lungs.

The penicillin was dissolved in 1 c.c. of saline and this solution was placed in a vaponefrin nebulizer† to which a mouthpiece and rebreathing bag, as designed by Barach, was attached (Fig. 1). The penicillin was ærosolized by running 6 to 8 litres of oxygen per minute through the vaporizer, which is sufficient to nebulize 1 c.c. of solution in ten to fifteen minutes. A glass Y tube is inserted in the rubber tubing connecting the nebulizer and the reducing valve of the oxygen tank. The patient closes the open end of the Y tube with his finger during the inspiratory phase and removes it during expiration, thus preventing waste of the penicillin. Following the erosolization of the penicillin onehalf of a c.c. of saline was added to the nebulizer and this in turn was vaporized to utilize any penicillin that might be left.

The nebulizers were washed out carefully with warm water after use, as otherwise the jets tended to become obstructed with a deposit of penicillin. If this occurred a few drops of hydrochloric acid dissolved and removed the obstruction.⁶ For the most part the treatment could be handled by the patients themselves, but if the patient was very ill a nurse was required. In one very ill but intelligent patient, who was unable to hold the mouthpiece to her mouth, we placed a support stand on the bed table to which were attached two clamps which held the nebulizer and mouthpiece so that the latter reached her mouth comfortably. In this way, without lifting her arm or moving her head, she could control the treatment satisfactorily by means of a finger applied to the Y tube.



Fig. 1.-Vaponephrin nebulizer with re-breathing bag.

MATERIAL

The present report is concerned with the treatment of 14 cases with penicillin ærosol. In all patients sputum cultures were done before therapy was started.* Penicillin sensitivity tests were done on the organisms found and, except as indicated, only those cases showing penicillinsensitive organisms were subjected to treatment. Serum penicillin levels were done on half of our patients and levels varying from 0.1 to 0.05 units per c.c. were obtained ½ to 1 hour after inhaling 25,000 units.

The diagnosis in each case was confirmed by all possible laboratory investigation.

CLINICAL RESULTS

Atypical virus pneumonia.—From the nature of this disease it was felt that penicillin inhalations would be valueless and a 4-day treatment on two patients substantiated this belief. No change in the temperature or course of the disease was noted and recovery in both patients occurred only after a prolonged illness.

^{*}The calcium penicillin was supplied by Ayerst, McKenna and Harrison, Limited, through the courtesy of Dr. A. Stanley Cook and Mr. E. G. Gregory.

[†] The Vaponefrin Company, Upper Darby, Pa.,

^{*}The bacteriology was done by Dr. Frances H. Prissick.

Pneumococcal pneumonia.—Four patients with lobar pneumonia were treated with penicillin erosol. Three of these patients were typical pneumonic patients and pneumococcus types I, II and XVIII were recovered from their respective sputa. In each case the temperature fell to normal within 8 to 24 hours and there was a dramatic symptomatic improvement. Resolution of the pneumonia occurred rapidly and without complication.

The fourth patient with a type V pneumonia was of interest as he had in addition a B. Friedländer infection in his sputum. On penicillin ærosol therapy the temperature fell to normal and the pneumococci disappeared from the sputum within 48 hours. The B. Friedländer persisted and his course was gradually downhill. Unfortunately not sufficient streptomycin could be obtained for a thorough clinical trial.

Of the three cases of straightforward lobar pneumonia, two we felt were grossly overtreated, as they received therapy for 9 and 10 days respectively. The third case was treated for 4 days, receiving 800,000 units and did just as well. It is possible that with the direct application of penicillin to the lungs, as is obtained with this method, even much smaller doses would be effective.

The results in these cases corroborate the findings of Segal and Ryder.⁵ We agree with them that its general use in pneumococcal pneumonia is unwarranted and feel as they do that its greatest value may lie in treating patients suffering from streptococcal or staphylococcal pneumonia.

Lung abscess.—Two patients with lung abscess were given penicillin ærosol therapy. The first of these patients had a very large abscess and was only treated for 3 days when it was discovered on bronchoscopic examination that there was a bronchial stenosis proximal to the abscess. Drainage through the bronchus was obviously impossible and she consequently was subjected to operation with ultimate recovery.

The second case was of great interest and his report is as follows:

R.T., a 42-year old blacksmith was admitted to hospital with the following history. On July 3, 1945, he underwent a complete dental extraction (21 teeth) under general anæsthesia. He returned to work but by July 20 had to stop because of a severe cough with the production of large quantities of foul-smelling sputum. He was admitted to a hospital in his home town where he was treated with sulfonamides and intramuscular penicillin (every three hours for four days) without effect. His cough and sputum continued, his temperature remained elevated, his ap-

petite failed and in the next three and a half months he lost 50 pounds in weight.

He was admitted to our wards on November 27. On admission he was emaciated and exhibited a peculiar greyish pallor. The nose and throat were normal. The chest expanded remarkably well but there was dullness to percussion and some râles could be heard in the left interscapular area. The spleen was enlarged. The white cell count was 20,000. There was a secondary anæmia present. The blood culture was negative. The Congo red test was negative. X-rays of the lungs revealed the presence of a lung abscess situated in the pulmonary segment supplied by the first dorsal branch of the left lower bronchus. There was a marked surrounding pneumonitis. Bronchoscopic examination revealed marked inflammation of the left main bronchus, the left lower lobe bronchus and its posterior median branch. A large amount of purulent material came from this area. No foreign body could be seen and none could be detected by tomographic examination.

A sputum culture showed nothing but a few coliform bacilli but smears revealed large numbers of spirochætes and fusiform bacilli. Although the department of bacteriology doubted that penicillin therapy would be of much value, penicillin ærosol therapy was started and given in 25,000 unit doses every three hours for six and a half weeks.

every three hours for six and a half weeks.

At the beginning of therapy he was expectorating 10 to 20 ounces of sputum daily and his temperature varied between 99 and 103° F. On the third day of treatment the patient appeared almost moribund and the sputum had increased to 26 ounces. The temperature was still elevated and it was only after prolonged discussion that it was decided to continue treatment. On the following day a dramatic improvement ensued and one day later the temperature fell to normal and remained normal thereafter. Concurrently the quantity of sputum decreased in amount to 5 to 7 ounces daily and the spirochætes and fusiform bacilli disappeared from the smears. By the end of 6 weeks the sputum was nil. Serial x-rays showed practical disappearance of the shadows in the left lung. The patient developed a prodigious appetite and gained 30 pounds in weight by the time of his discharge on January 24, 1946. On April 11, he returned to Montreal having gained another 20 pounds. He had had no return of symptoms and an x-ray examination at this time showed normal lung shadows.

We felt that this patient's lung abscess was the result of a pulmonary infection by Vincent's organisms and believe it to be the first case of lung abscess with this etiology to be treated with penicillin ærosol. Recent reports^{7, 8} have shown the efficacy of intramuscular and topical penicillin therapy on the oral lesions caused by fusospirochætosis, and it has been suggested that more careful therapy of these lesions would prevent the occurrence of broncho-pneumonia and lung abscess due to these organisms.

The successful treatment of three other cases of lung abscess with penicillin ærosol has been reported in the literature^{2, 5} and it has been indicated that its chief value lies in the treatment of abscesses caused by non-putrid aerobic bacteria. We believe the result in this case disproves this assumption and feel that all patients with this disease should be given a thorough clinical trial.

Bronchiectasis and chronic bronchitis.—It was decided at the beginning of our investigation that if any patient suffering from either of these diseases showed penicillin sensitive organisms in the sputum, they were to receive prolonged ærosol therapy. It was felt that intensive treatment would be necessary to eradicate such longstanding infections. Our first three cases all showed penicillin-sensitive organsms and were treated from 3 to 5 weeks apiece. Much to our disappointment they showed no improvement whatsoever. In one case the sputum actually increased in amount and only returned to its former level on cessation of treatment. Sputum cultures were repeated on these patients and revealed that, although all penicillin-sensitive organisms had disappeared, in two cases B, coli was still present and in the other H. influenzæ was found.

With this experience it was felt that if no improvement had occurred within one week's time it indicated the presence of penicillinresistant organisms and prolonged therapy was unwarranted. Our last three patients received only a short course of treatment and in two of these no benefit was obtained, while in the third patient, who had evidence of a bronchiectasis with pulmonary fibrosis and pulmonary heart disease, a striking improvement occurred within five days. He could breathe much more easily, his cough was practically nil and the sputum dropped from 30 to 50 c.c. daily to none. He was forced to leave the hospital because of personal affairs and several weeks later developed a respiratory infection which resulted in a return to his previous state. Unfortunately he was unable to return to the hospital for further treatment.

These cases illustrate the futility of this form of treatment in the presence of penicillin-Recently Olsen4 has adresistant bacteria. vocated the inhalation of an ærosol in which penicillin and streptomycin are combined. In this way both Gram-positive and Gram-negative organisms can be eradicated from the sputum. It would seem that this will be the method of choice in the preoperative treatment of bronchiectasis and therapeutically in those cases of chronic broncho-pulmonary disease where no surgical treatment is indicated.

Asthma.—Two of our patients with bronchiectasis, one with chronic bronchitis and one with lobar pneumonia were also subject to asthma. In none of these cases did any improvement,

of the asthma occur. In two patients the attacks became much worse and in one of these cases was of such severity that therapy had to be discontinued. This patient had had a prolonged course of intramuscular penicillin a year previously and it was felt that she might have developed a penicillin sensitivity.

SUMMARY AND CONCLUSIONS

1. Fourteen patients with broncho-pulmonary disease were treated with penicillin ærosol. dosage of 25,000 units every three hours was given. This dosage appears adequate and in no case was any other form of therapy used.

2. Virus pneumonia is unaffected by this form of therapy.

3. Four cases of lobar pneumonia were successfully treated. The course of a concurrent Friedländer infection in one of these patients was not altered.

4. Two patients with lung abscess were treated. One was discovered to have a bronchial stenosis which obviated drainage of the abscess and probably also hindered entry of penicillin to the abscess. The second patient with a lung abscess of 4½ months' duration was cured of his abscess after $6\frac{1}{2}$ weeks of therapy. This abscess was due to a Vincent's infection.

5. Three cases of bronchiectasis and 3 with chronic bronchitis, with at least a 10 year history, were given penicillin ærosol. In but one case was a favourable result obtained. In 4 of the 5 other cases penicillin resistant Gramnegative organisms were found in the sputum after arosol therapy. The longer the infection the more varied the resulting bacteriology is likely to be. Further investigation with a mixture of penicillin and streptomycin ærosol, as used by Olsen, is indicated in these patients. If favourable results are not obtained within one week there is no value in continuing therapy.

6. In 5 of our patients with an associated asthma no alleviation of the asthmatic state occurred. One case of possible sensitivity to penicillin was noted.

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ORAL FOLIC ACID THERAPY IN THE TREATMENT OF PERNICIOUS (ADDISONIAN) ANÆMIA*

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THE following is a brief outline of the origin and development of folic acid substances and their application to blood dyscrasias.

In 1940 Hogan and Parrott¹ were able to cure the anæmia and stimulate the growth of chicks which had been fed on purified diets by the use of liver extract. The active factor in the therapy appeared to be a new member of the vitamin B complex group. They suggested that this member be called vitamin Be. Snell and Peterson² showed that this factor had many properties which were similar to the eluate factor (growth factor of liver) required for the growth of lactobacillus casei. Mills and his associates3 were able to reproduce Hogan and Parrott's work using the eluate factor. Mitchell, Snell and Williams⁴ produced an almost pure chemical entity from spinach which was necessary for the growth of the streptococcus lactis. They called this substance folic acid and demonstrated that it can be derived from liver, yeast, kidney, mushrooms and many green leaves including grass.

Hutchings, Bohonos and Peterson⁵ demonstrated a similarity between folic acid and the eluate factor. In 1943 Pfiffner and his coworkers⁶ produced a crystalline substance from liver with folic acid activity, viz., activity for the growth of the strepticoccus lactis or lactobacillus casei, Keresztesy, Rickes and Stokes⁷ produced a similar substance from an unstated source and Stokstad⁸ also produced a crystalline substance from liver and yeast. Wright and

Synthesis of a folic acid substance identical with the lactobacillus casei factor was accomplished by Angier and fifteen co-workers17 at the Lederle Laboratories, and the Calco Division of the American Cyanamide Company. work has made possible the clinical application of the experimental findings. The clinical studies presented here were carried out with synthetic folic acid supplied by the Lederle Laboratories.

The experimental studies referred to above suggest possible wide clinical application of folic acid as an aid in the treatment of various blood dyscrasias, with particular reference to the macrocytic anæmias, leukopenias and thrombocytopenias. Spies¹⁸ has treated 45 clinical cases with folic acid. In his group were included nutritional macrocytic anæmias, pernicious anæmias in relapse, the macrocytic anæmias of sprue, pellagra and pregnancy. His results were excellent in these cases. On the other hand, no response was obtained with this drug in the anæmias of leukæmia, aplastic anæmia, or irondeficiency anæmia. Darby, Jones and Johnson¹⁹ report remarkably favourable results in three cases of sprue. Watson, Sebrell, McKelvey and Daft²⁰ report that 5 mgm. of folic acid daily by mouth had no beneficial effects in 8 cases of refractory anæmia, one case of leukopenia which developed after sulfonamide therapy, and one case of Hodgkin's disease with leukopenia which presumably developed after x-ray therapy. Elevations of the leukocyte count were noted in 6 cases of leukopenia resulting from local intensive x-ray therapy for carcinoma of the cervix. and in one case of polycythæmia vera receiving total body radiation. Johnson, Hamilton and Mitchell²¹ report that 5 times as much folic acid is lost through the skin by profuse sweating as by the kidneys.

MATERIAL STUDIED

The successful results in the treatment of the nutritional macrocytic anæmias experimentally with folic acid suggested to us, among others,

Welch⁹ demonstrated folic acid activity in xanthopterin and urine after they had been incubated in vitro with fresh rats' liver. Concurrently, many investigators 10 to 16 demonstrated the growth-stimulating power and also the marked antianæmic effect of folic acid on chicks, rats and monkeys fed on purified diets, and in some instances, also bled and fed sulfonamide

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the value of a study of the effects of this therapy in pernicious (Addisonian) anæmia. With this problem before us we chose cases which had every criterion possible supporting the diagnosis of the disease. Included in the study are the history, physical examination, laboratory investigations including hæmogram, sternal bone marrow aspiration biopsy, neurological and gastrointestinal investigations. The therapy was followed by the peripheral blood changes, reticulocyte response and bone marrow changes. The subsequent mental and physical changes were carefully observed.

The patients selected for this study followed essentially the same pattern: a history of fatigue, loss of appetite, depression, lack of strength and tone, dyspnæa on exertion, sensory disturbances but no vomiting, diarrhea or constipation. Examination showed a pale lemon-yellow coloured skin, fairly good nutrition, smooth tongue with glossitis, some gingivitis, disturbances in vibration sense, an achlorhydria after histamine, and negative x-ray gastrointestinal investigation. Compensation was good and a hæmic murmur was present at the base. The peripheral blood showed a marked hyperchromic macrocytic regenerative and degenerative anæmia with increased resistance of red blood cells, a leukopenia with hypersegmented polymorphonuclear leukocytes with a relative lymphocytosis and slightly reduced platelets. Reticulocytes were within normal range. The marrow showed reduced activity in red and white cell elements with an arrested red cell maturation in the megaloblastic stage. Liver function was impaired. This was demonstrated by several tests. Fundi, cranial nerves, lungs, kidneys, locomotor and integumentary systems were normal. Stool examinations were negative for occult blood and parasites.

The results of the clinical study of four cases of pernicious anæmia are presented here and to these are appended a note on three other cases treated with folic acid, viz., a hamolytic anamia, an aplastic anæmia, and a splenic panhæmatopenia.

THERAPY

The patients were allowed a routine hospital diet and no therapy other than folic acid was given. The initial dosage of folic acid was 20 to 40 mgm. daily given by mouth in divided doses before meals. The synthetic preparation folvite was used. Iron therapy was added in some cases when the blood became hypochromic. Hydrochloric acid was permitted in one case after three weeks of folic acid therapy to control post-cibal distress. It may be added that folic acid may be used intravenously or intramuscularly by converting it to the soluble sodium salt, by the addition of bicarbonate. The solution is sterilized by passing it through a bacterial filter.

CASE 1

J.C., female, aged 55. An outside patient referred by Dr. Dorothy Bentley for hæmatological study.

Positive findings from history.—Poor appetite for years. Diet consisted mainly of potatoes, tea, bread and marmalade. Barely ate fresh vegetables, salads, meats or deserts. Mild anæmia for three years. Werse in the last five months with a yellowish skin, sore tongue, pre-cordial pain on exertion and constant burning of the feet. Personal history and functional inquiry irrelevant. One daughter has pulmonary tuberculosis. Bowel movements normal without laxatives.

Positive findings from physical examination .pressure 175/95, pale yellowish well nourished female in no apparent distress. Tongue reddened and smooth, gingivitis present about few remaining teeth. Heart enlarged slightly to the left. Soft systolic murmur heard over the apex and base of the heart. Liver palpable one-half inch below costal margin. Spleen not Absent vibration sense and impalpable, no masses. paired two-point discrimination below the knees, impaired sense of position of the toes.

Special examinations.—Urine and stool analysis negative. Gastric analysis no free hydrochloric acid present.

Barium series negative. Summary of hæmatological findings.—Hæmogram showed a very marked hyperchromic macrocytic degenerative and regenerative anemia. There was a very marked anisocytosis and macrocytosis with ovalocytosis, polychromatophilia, Cabot rings, stippled cells and a 3% reticulocyte count. Red blood cells 2,280,000, Hgb. 59%, white blood cells 4,400, compact cells 26.2%; increased resistance of red blood cells, prothrombin time 60% of normal.

TABLE I.

Day of therapy	Red blood cells millions per c.mm.	Hgb. % (15.6 gm. per 100 c.c.)	locyte	Daily dosage folic acid mgm.
1	2.45	54	4 .	20
7	3.56	59	5	20
14	3.65	71	4	20
21	3.90	75	1	15
28	4.59	75		10
37	4.72	81		5
44	4.39	82		5
51	4.41	90		3
65	4.25	90		3
69	3.93	83		5
79	5.19	92		5

CASE 2

C.P., male, aged 52. Admitted to the Royal Victoria Hospital, January 11, 1946.

Positive findings from the history.—Lack of energy, loss of weight and appetite, five months. Precordial loss of weight and appeare, and pains on exertion, three months. Sore mouth, stiffness and weakness of legs, three months. Chronic constipation requiring cathartics. P.C. epigastric fullness and nausea for six years. Family and personal history, and functional inquiry irrelevant. No dietary indiscretion noted.

Positive findings from physical examination.pressure 125/75, pale slightly yellowish male in no apparent distress, showing evidence of recent weight loss. Marked atrophy of papille of tongue. No cardiac murmurs. Liver and spleen not palpable. No abdominal masses. No sensory disturbances other than very slightly reduced vibration sensation over the left external malleolus.

Special examinations.—Gastric analysis, no free acid after histamine. Urinalysis, trace of albumin present. Blood: Kahn and Wassermann negative. Stool examina-tion: negative. Electrocardiogram: occasional ventricular extrasystole. Barium series and barium enema: negative. Blood chemistry January 12: total protein 6.49 gm. %; albumin 4.32 gm. %; globulin 2.17%; alkaline phosphatase 5.22 units %; bilirubin direct 0.43 mgm. %; bilirubin total 1.45 mgm. %; bilirubin D/T 29.3%; cephalin cholesterol flocculation 24 hr. 3 plus, 48 hr. 3 plus. B.S.P. retention 3.4%; hippuric acid synthesis 0.47 gm. Blood chemistry January 21: Total protein 6.70 gm. %; albumin 4.55 gm. %; bilirubin direct 0.3 mgm. %; total 0.65 mgm. %; cephalin tricular extrasystole. Barium series and barium enema:

cholesterol flocculation for 24 hr. 1 plus, 48 hr. 1 plus;

hippuric acid synthesis 1.02 gm.

Summary of hæmatological findings. — Hæmogram showed a marked hyperchromic macrocytic regenerative and degenerative type of anemia with anisocytosis, poikilocytosis many normoblasts, and less than 1% reticulocytes. Red blood cells 1,660,000, Hgb. 39%, white blood cells 7,500, compact cells 18%, prothrombin time 100% of normal. Sternal bone marrow aspiration biopsy showed moderate activity in both red and white cell elements with maturation arrest in the megaloblastic stage.

CASE 3

A.M., male, aged 65. Admitted to the Royal Victoria Hospital February 4, 1946. Referred by Dr. Colin Sutherland for hæmatological investigation.

Positive findings from the history.—Numbness of fingers, legs and feet, shortness of breath, weakness

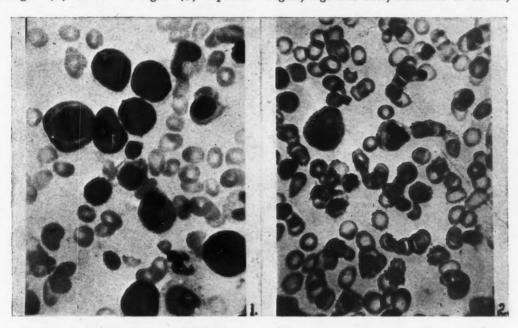


Fig. 1.-Magnification X820. Marrow showing maturation arrest in megaloblastic

e. Note island of megaloblasts and macrocytosis.

Fig. 2.—Magnification X820. Normoblastic marrow and normocytosis 14 days after inception of oral folic acid therapy 30 mgm. daily. Note the change in red blood cell morphology as compared with that in Fig. 1.

TABLE II.

Day of therapy	Red blood cells millions per c.mm.	Hgb. % (15.6 gm. per 100 c.c.)	Reticu- locyte count %	Daily dosage folic acid mgm.
2	1.30	40	3	30
4	1.31	40	5	30
6	1.76	43	15	30
8	1.69	40	45	30
9	2.23	48	15	30
11	2.65	54	11	30
14	2.90	57	8	30
14	Bone marrow		biopsy:	normoblastic
17	3.60	62	5	30
24	4.08	75	3	20
26	3.61	75	1	
30	3.88		1	10
32		80	2	5 5
	3.58	81	1	Đ
34	3.60	80	Ţ	5
37	3.64	80	1	15
41	4.07	80	3	15
43	3.94	87	1	15
55	4.43	95	1	15

and fatigue, loss of appetite, loss of 25 pounds in weight over a period of five months. Functional inquiry, family history and personal history irrelevant. There were no dietary indiscretions. Bowel movements have been regular.

Positive findings from physical examination.—A pale, icteric, fairly well nourished man in no apparent distress. Blood pressure 130/70, soft systolic murmur at apex. Tongue is smooth, liver palpable one inch below costal margin, spleen not palpable. An impairment of position sense in toes, two-point discrimination

ment or position sense in toes, two-point discrimination and figure writing. A complete loss of vibration sensibility below the knees.

Special examinations.—Urinalysis negative. Blood Wassermann and Kahn: negative. Gastric analysis, no free hydrochloric acid after histamine; stool examination: negative. Barium series and enems were amination: negative. Barium series and enema were negative. Electrocardiogram: normal tracing. Blood chemistry February 7: non-protein nitrogen: 31.1 mgm. %; total protein 6.83 gm. %; albumin 5.22 gm. %; globulin 1.61 gm. %; bilirubin direct 0.75 mgm. %; indirect 1.91 mgm. %; D/T 39.5%. B.S.P. retention 12.5%; cephalin cholesterol flocculation 24 hours, 2 plus, 48 hours, 2 plus. Blood chemistry March 4: total bilirubin 0.45 mgm. %; cephalin cholesterol negative; B.S.P. retention 9.7%. B.S.P. retention 9.7%.

TABLE III.

Day of therapy	Red blood cells millions per c.mm.	Hgb. % (15.6 gm. per 100 c.c.)	locyte	
1	1.00	37	4	20
3	1.23	36	6	40
4	1.25	39	18	40
5	1.50	41	20	40
6	1.64	40	35	40
7	1.70	39	22	40
8	2.05	46	20	40
10	2.00	43	10	40
12	2.12	49	8	40
14	2.30	51	10	30
17	2.53	58	4	30
19	2.51	57		30
23	2.75	51	4 4 2	30
29	3.50	64		Changed to

therapy of his own accord and hence developed marked

weakness, dyspnæa and thirst.

Positive findings from physical examination.— An

Positive Indings from physical examination.—An obese male with a pale yellowish dry skin, tongue smooth and red. Liver and spleen just palpable. Slight diminution of vibration sense in both legs.

Special examinations.—Urinalysis; sugar 4 plus, acetone 1 plus. Blood chemistry; fasting sugar 315 mgm. %; cholesterol 119 mgm. %; bilirubin direct 0.45 mgm. %; indirect 1.15 mgm. %; D/T 39%.

Summary of hæmatological findings.—Hæmogram showed a marked hyperchromic macrocytic regenerative

showed a marked hyperchromic macrocytic regenerative showed a marked hyperchromic macrocytic regenerative and degenerative type of anæmia with anisocytosis, poikilocytosis, ovalocytosis, numerous normoblasts and erythroblasts, polychromatophilia and Howell Jolly bodies. Red blood cells 2,080,000, Hgb. 55%, white blood cells 3,400, compact cells 27.2%, reticulocyte count 2%, increased resistance of red blood cells. Prothrombin time 100% of normal. Bone marrow biopsy showed moderate activity in red and white cell elements with a maturation arrest in the megaloblastic stage with numerous mitotic figures. numerous mitotic figures.

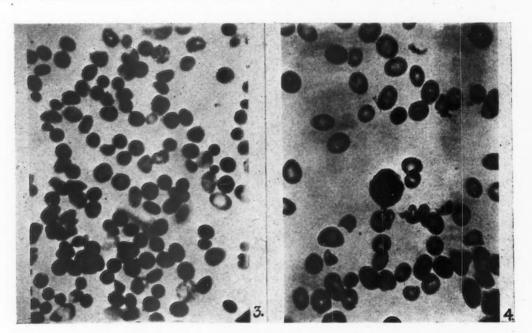


Fig. 3.—Magnification X820. Reticulocyte response on folic acid therapy. Fig. 4.—Magnification X820. Peripheral blood picture before folic acid therapy was begun. Note erythroblast and marked anisocytosis, poikilocytosis and ovalocytosis.

Summary of hæmatological findings. — Hæmogram showed a marked hyperchromic macrocytic regenerative and degenerative type of anæmia with ovalocytosis, poikilocytosis, anisocytosis, numerous normoblasts and a reticulocyte count of less than 1%. Prothrombin time 85% of normal. Red blood cells 1,400,000, Hgb. 39%, white blood cells 4,500, compact cells 17.4%. Increased resistance of red blood cells.

CASE 4

J.F., male, aged 56. Admitted to the Royal Victoria

Hospital, February 14, 1946.

Positive findings from the history.—Two previous admissions, one in 1924 diagnosed as pernicious anæmia. At that time he had a marked hyperchromic macrocytic anæmia, no free gastric hydrochloric acid after histamine and a bone marrow biopsy showed a maturation arrest in the megaloblastic stage. On the second admission in 1942, he had in addition diabetes mellitus. From this time he received one or two injections of liver weekly from his physician and twelve units of protamin zinc insulin, but felt weak for the past two years. Eight months previous to his admission he stopped all

TABLE IV.

Day of therapy	Red blood cells millions per c.mm.		locyte	Daily dosage folic acid mgm.
2	2.00	50	3	30
3	1.74	48	4	30
4	2.38	54	26	30
5	2.36	57	26	30
6	2.22	54	22	30
7	2.35	56	20	30
9	2.36	58	58 26	
10	Bone marro with good a	w biopsy— activity of all	normoble element	astic marrows.
11	2.65	67	18	20
14	2.90	68	8	20
24	3.66	75	2	20

ANALYSIS OF RESULTS

The initial daily dosage of 20 to 40 mgm. of folic acid given by mouth was sufficient to produce a striking response. Within three to four days there was a marked feeling of well-being. Appetite and soreness of the tongue improved. One case (C.P.) became almost ravenous. In this case also glossitis had been a very disturbing feature and it too was much improved within a week. Another case (J.C.) began to eat salads, some meat and vegetables which she had not eaten for years, although we did not advise or encourage this. There was an improvement of subjective sensory disturbances although no change could be demonstrated objectively.

Reticulocytosis was prompt and maximum responses of 26 to 45% occurred on the fourth to ninth day of therapy. Red blood cells averaged a daily increase of approximately 90,000 per c.mm. and showed an early return towards normal size and shape. Hæmoglobin rose more than 1% daily, the colour index declined to less than 1 and the blood picture became hypochromic at times as the hæmoglobinization lagged. The bone marrow before therapy showed a megaloblastic arrest of the red cell elements and rapidly became normoblastic in type. This was accompanied by an improvement of all the cellular elements, substantiated further by a return of the white blood count and platelet count to normal levels. Liver function impairment evidenced by several tests showed an early return to normal values.

Our follow-up studies so far are limited to the duration of therapy of cases under our observation and the amount of drug at our disposal. However, the maintenance dosage is arbitrarily placed at 5 mgm. daily in one case and 15 mgm. daily in another. It is expected, in view of the nature of the disease, that the treatment will have to be carried out on the same basis as liver therapy. No toxicity in the nature of generalized or local reactions to the folic acid was observed. It would appear that folic acid therapy does not need to be supplemented by special dietary measures, added vitamin or hydrochloric acid therapy.

We do not feel, at present, that this treatment is more effective than liver therapy in pernicious anæmia, but we do feel that there are some advantages, viz., ease of carrying on therapy and hence lessening chances of complications and relapses and preventing negligence in following

therapy. It may shorten the period of hospitalization, and outdoor hospital control may be easier.

DISCUSSION

The action of the drug seems to be much the same as that of liver, namely speedier maturation of megaloblasts. Iron therapy may have to supplement the folic acid in the late stages of the therapy when red cell formation outruns hæmoglobinization. Liver therapy may be needed and can take over the treatment without causing any disturbance, especially when the drug is not available. We have not noted any allergic manifestations. The drug is well toler-No digestive task is imposed on the stomach despite the achlorhydria and apparently no disturbed absorption, transportation or utilization. The system is spared the necessity of additional therapy or foodstuffs. The prompt relief of symptoms was impressive, and the results obtained were convincing of the specificity of the drug as being at least one important factor in promoting maturation of megablasts.

We have used folic acid in one case of aplastic anæmia and one case of primary splenic hæmatopenia. A dosage of 20 mgm, daily by mouth failed to produce any significant improvement. The latter case was benefited only by splenectomy. A child of two years of age with hæmolytic anæmia had not had an acute crisis during three-and-a-half months of folic acid therapy of 15 mgm. daily. However, this apparent clinical improvement may be coincident as there has been no change on withdrawing the drug for one month.

SUMMARY AND CONCLUSIONS

1. The treatment of pernicious (Addisonian) anæmia by folic acid (folvite) or vitamin B₀ has been found to be efficacious in primary so-called virgin untreated cases of pernicious anæmia as well as in relapse of old previously-treated cases with liver therapy.

2. Folic acid therapy by oral administration is well tolerated. It is prompt, painless and unexacting and gives evidence of its effectiveness by early reticulocytosis and subjective and objective improvement.

3. The prompt improvement needs comparatively large dosage, 20 to 40 mgm. daily. The maintenance dose seems to be small, 5 to 15 mgm. daily, at present, but it may be less. In the light of our present knowledge this treatment is

no guarantee against relapses if the maintenance dose is not properly gauged. Indifference to therapy or discontinuance will lead to the same results as in liver therapy.

4. We have not noted any intolerance to the drug or allergic manifestations so far.

5. We feel that proper dietary support may supplement the efficiency of the drug, even perhaps the additional use of hydrochloric acid, although we have not felt it necessary to avail ourselves of these additional therapeutic measures.

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Methinks that coarse men of bad habits and little power of reason do not deserve so fine an instrument or so great a variety of mechanism as those endowed with ideas and with great reasoning power, but merely a sack wherein their food is received, and from whence it passes away. For in truth one can only reckon them as a passage for food; since it does not seem to me that they have anything in common with the human race except speech and shape, and in all else they are far below the level of the beasts.-Leonardo Da Vinci.

OBSERVATIONS ON GERMAN WAR SURGERY

By Major R. K. Magee, R.C.A.M.C., B.A., M.D. (Tor.), F.R.C.S., F.R.C.S.[C.]*

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X/E had all wondered just how good or how bad was German surgery. Then we had the opportunity to treat more than one thousand surgical cases of German prisoners of war over a two months' period. Of these many were captured in German hospitals where they had been under the care of German surgeons for some months; while others were captured after wounding and had been treated by Canadians. There was afforded us then a unique opportunity to compare German surgery with our own.

To begin with, in taking over large numbers of German prisoners we had some adjustments to make. Our policy on fraternization had to be consolidated, basic German classes were instituted, and English-speaking Germans were utilized in ward management.

The prisoners ranged in age from 16 to 65 years. They seemed undernourished, but a survey of weight gain or loss since their enlistment was not significant. Many were seriously wounded and blood hæmoglobin values were low-30, 40 or 50%. The medical division of the hospital organized our own blood bank and German prisoners came from the cages and gave blood for the wounded Germans in our hospital.

In the disorganization of the German retreat we received prisoners as a rule without documents or history. Some however from base hospitals had voluminous typed histories and the investigations had been extensive, especially in their special centres, as for example in their craniocerebral centres. It was interesting to see a note at the bottom of the page in German read "Owing to tactical considerations this patient will be transferred to the rear". But the Allies arrived first.

The local condition of the wounds was a great surprise to us. Nearly all were infected and malodorous, often wrapped in paper towelling and soaking in foul pus. Rubber drains were plentiful, often through and through in

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joints, and into the depths in wounds of chest, skull and fractures. The tube was grown around with granulations and bathed in pus. Many organisms were cultured including B. coli, B. proteus, B. pyocyaneus, clostridii, etc. Case 1 (Fig. 1) is an example. This patient with a compound fracture of the tibia and fibula on Jaunary 23, 1945, was operated upon by German surgeons 2 hours after wounding. On February 14, windows were cut in the plaster. On admission to our hospital on

immediate amputation, which was done by Canadian surgeons; he also had a compound oblique fracture of the right humerus (Fig. 4) which was debrided with multiple other wounds. He was given penicillin and sulfa therapy, and was admitted to our hospital on April 14, with a hæmoglobin of 55%. His blood was restored to normal and on April 19 an open reduction of the humerus with internal fixation by stainless steel screw (Fig. 5) was done with complete closure, together with



Fig. 1.—Compound comminuted fracture of tibia three months old as it was admitted from German hospital. Note the calcification in the infected soft tissues. Fig. 2.—Infected tissue bulging through plaster window on admission from German hospital. Fig. 3.—After plaster was removed and the extensive abscesses from heel to mid thigh had been widely opened.

April 7, his x-ray showed calcification in the infected granulation tissue which bulged out of the two windows (Fig. 2). His temperature was 103, and the deep abscesses that extended from the ankle to the popliteal region under the plaster are shown widely opened (Fig. 3).

This case is in sharp contrast to the results of adequate primary debridement, penicillin, blood replacement, closed plaster dressing, and secondary suture, in which 90% of wounds were healed within 3 to 4 weeks. Such a case is illustrated by Case 2. On April 11, he had a machine gun wound of the left leg requiring

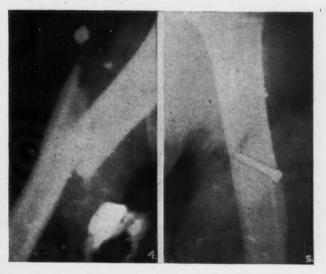


Fig. 4. — Compound fracture right humerus by machine gun bullet. Fig. 5.—Position after internal fixation with screw.

complete closure of the amputation stump of the right thigh and of five other wounds of the right leg and abdomen. On April 29, 18 days after wounding, his temperature was normal and all wounds were perfectly healed.

Craniocerebral wounds amongst the Germans had apparently received adequate debridement judged by the meticulous notes and reports, but they did not have closure of dura and scalp in all cases, and we received many cases with drains and dural defects and infected wounds, with cerebral fungi and cerebrospinal leaks. These presented problems to tax the ingenuity of the surgeon and the efficacy of our chemotherapeutic agents.

Faciomaxillary surgery was well done in the German special centres, and this was corroborated by Dutch surgeons who worked beside German cases during the occupation. Fig. 6 shows the late result of a delayed shift of a flap taken from the left cheek and swung to fill a defect of the left angle of the mouth and lower lip. The result was excellent.

Patients with penetrating wounds of the chest were encountered who under German care had never had a chest x-ray or aspiration over a 3 months' period and who had clotted hæmothorax. Fig. 7 shows the thickened layer being removed from the lung, pleura and diaphragm. Intercostal drainage was used for large hæmothoraces and apparently repeated aspiration was less frequently employed than in our hands where results were so satisfactory.

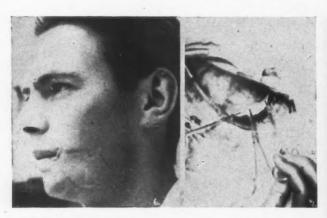


Fig. 6.—Results of delayed shift of a flap to replace a defect in the left angle of the mouth by German plastic surgeons. Fig. 7.—Stripping off blood and fibrinous membrane from pleura and lung.

In severe or infected joint wounds the Germans resorted to "excision" and we saw a number of wounds so treated. In the knee the lower end of the femur and upper end of tibia were sawed across and the patella removed and a drain left down to the space. These cases came to us with a window in a cast soaked in foul pus and one could see straight through from the wound in front to the posterior capsule of the joint. Fig. 8 is a photo of an x-ray of such a case and the large rubber drain may be seen. This case with a hæmoglobin of 40% and showing cultures of hæmolytic streptococci, B. proteus, clostridii, etc., was closed and healing was obtained by secondary suture and penicillin.

For comparison we show a compound fracture of patella and medial condyle treated by a Canadian surgeon (Fig. 9). The primary operation was on April 11, he was given penicillin and sulfonamides, and had secondary suture on April 19. On April 30, 19 days after wounding the wound was healed, sutures were out, temperature was normal, there was no fluid in the joint and he was having quadriceps exercises.

The German surgeons do a primary guillotine amputation which we consider a surgical crime. Many such cases coming to us had bone ends protruding and covered by granulations and pus. One case had had a bilateral amputation of the legs by the Germans in January, and when we received him in April no attempt had been made to close his stumps. With skin grafts and penicillin large areas were completely healed in 3 weeks preparatory to reamputation (Fig. 10). We had German

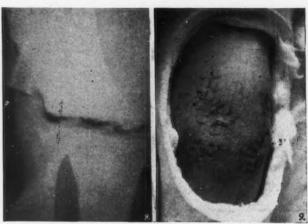


Fig. 8.—Excision of knee for infection. Note large drainage tube. Fig. 9.—Compound wound into knee joint healed and free from fluid eighteen days after wounding.



Fig. 10.—Bilateral amputation which was still draining pus and open three months after amputation. After cleaning and skin grafting it was healed as shown in three weeks' time.

prisoners of war who were wearing artificial limbs provided by the German State, and one of them said that he had been in a special battalion, just as the Germans had a special division made up of peptic ulcer cases. From these amputees I learned that the time from wounding to closure of their amputation was about 6 months and from wounding to wearing an artificial limb was about a year.

In the two months that we held and treated over one thousand seriously wounded German surgical cases we gave the chemotherapeutic agents and limb-saving surgery their fullest scope. In that time we did only one amputation, which was for gas gangrene. It is true we may have saved worthless limbs, but never before this war have such limbs been saved with so little risk to life. If later assessment of function so dictates, surgery may then be employed. There were two surgical deaths, one from a pulmonary embolus, one from a severe retroperitoneal hæmatoma. And we know of one death after leaving our hospital, in a patient who had an abdominal wound, colostomy, peritonitis, and liver abscess.

CONCLUSIONS

From our observations, subsequently corroborated by Dutch surgeons, it would appear evident that the German surgeons have suffered for years from deprivation of the medical influence of the outside world and failed to employ the outstanding advances of primary debridement, penicillin, and secondary closure of war wounds. The tremendous importance of these advances is made the more striking by comparison with cases such as we have seen among these prisoners from Germany.

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RÉSUMÉ

Des observations directes, corroborées par des chirurgiens hollandais indiquent que les chirurgiens allemands ont été privés pendant la guerre de la connaissance des progrès accomplis chez les Nations Unies; ils ignoraient, notamment, les avantages du débridement hâtif, de la pénicilline et de la fermeture rapide des plaies. Les cas observés n'ont évidemment pas été soumis à nos techniques.

JEAN SAUCIER

There are other elements that cannot be left out of the category of qualities a doctor needs if he wants to exercise the art of medicine with success. Dignity is one of these. The dignity I have in mind does not depend on what is facetiously called the bedside manner, nor upon the cut of the clothes, nor upon the appointments of the office. I can best define it by saying what is absent from it—familiarity, gossipiness, pomposity, and haste.—David Riesman.

A FAMILIAL PERIPHERAL NEUROPATHY OF UNKNOWN ETIOLOGY RESEMBLING MORVAN'S DISEASE

By Squadron Leader M. A. Ogryzlo, R.C.A.F.*

REPORTS on syringomyelia of the classical type, and the varied form known as Morvan's disease or syndrome are not uncommon in the literature. A recent review by Parks and Staples1 however, has directed attention to a group of cases with peripheral neuropathy, characterized by a symmetrical, glove-like disturbance of sensibility in the distal portions of the limbs, together with severe trophic changes, in which many of the clinical features do not seem to justify their inclusion under the term of Morvan's disease. Signs of involvement of the brain stem or spinal cord in this group are strikingly absent. The following paper deals with four such cases, three of whom were studied at the R.C.A.F. Sir Frederick Banting Hospital. All were members of one family numbering twelve children, residing in a small village outpost of Newfoundland.

The most characteristic finding in syringomyelia is the presence of dissociated anæsthesia, with loss of appreciation of pain and temperature, and preservation of touch and the various forms of deep sensibility.' Since the lesion is usually situated in the upper segments of the spinal cord, the sensory disturbance is commonly found distributed in a segmental or jacket form over the arms, shoulders, chest and trunk. Lumbosacral involvement with sensory changes occurring in the lower extremities is not frequent. As the disease progresses other cardinal signs of a cord lesion make their appearance, such as muscle atrophy affecting chiefly the small muscles of the hands, signs of involvement of the lateral columns with spasticity or exaggerated reflexes in the lower extremities, and manifold vasomotor and trophic disturbances over the same distribution. These findings are usually asymmetrical. Pupillary changes of the Horner-Bernard type are occasionally encountered.

Morvan's disease is generally described as a variety of syringomyelia in which, in addition to the signs of the typical cord lesion, there are symptoms of pronounced changes in the peripheral nerves. The early stages are marked by

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intense pains in the limbs followed by total loss of all sensibility in the hands and frequently in the feet. Progressive atrophy of the intrinsic muscles of the hands and feet also occurs, with associated vasomotor disturbances and severe trophic changes.

The differential diagnosis of the syndrome typifying the cases to be described and its resemblance to Morvan's disease will be discussed later.

CASE 1

E.R., a 22-year old male, was admitted to hospital on November 3, 1944, having suffered a spontaneous fracture of the left femur.

History.—The fracture occurred while he was walking along a level roadway, was not associated with any undue stress and caused only moderate pain. The patient merely felt a crack in the left thigh and fell to the ground. He wore an artificial limb on the right leg which had previously been amputated owing to disorganization of the ankle and tarsus.

The underlying condition had been present as long as the patient could remember, dating back to early childhood. His hands and feet had always been sub-



Fig. 1 Fig. 2

Fig. 1. (Case 1).—Left foot showing the deformed toes and trophic character of the skin, with ulceration on either side of the tarsus. Fig. 2. (Case 1).—X-ray of the left foot showing trophic destruction of the digits and metatarsal bones.

ject to a peculiar numbness, aggravated by cold, together with diminished sensation to pain. The patient experienced particular difficulty in handling small objects such as cigarettes, which would fall from his fingers when his attention was distracted. He would also find it necessary to evert his pockets in order to retrieve small coins visually, since he could not feel them with his fingers. Cigarette burns caused only a moderate degree of pain.

At the age of fourteen he began to develop trophic changes in the feet, consisting of repeated ulceration and infection about the toes with subsequent loss of the nails. The process commenced in the left great toe and gradually spread to involve nearly all the distal portions of both feet, with sinus formation, sloughing of bone and gradual spontaneous amputation of the digits. Three years later, in 1940, a perforating ulcer developed across the ball of the right foot. This was drained and healed, but broke down repeatedly with eventual loss of the medial three

toes. Shortly afterward, the right ankle became swollen and finally completely disorganized, so that for a period of time he walked on an inverted painless foot. In September, 1943, the right leg was amputated below the knee and he was fitted with an artificial limb. Throughout this period only moderate pain was experienced during the acute infective phases of the disease.

Functional enquiry showed nothing of importance. The personal history showed a fracture of one leg in childhood. He rarely smoked, did not indulge in alcohol and was mentally alert although he could not read or write.

Physical examination.—The patient was a stunted adult male, measuring five feet four inches in height and weighing 115 pounds. The lateral halves of the eyebrows were denuded of hair. The eyes, ears, nose and throat were normal, although there was moderate gingivitis with retraction of the gums. The upper four incisors were absent, while the remaining teeth were fairly well preserved. The thyroid gland, superficial lymph nodes, heart, lungs and abdomen were negative, heart rate 80, blood pressure 108/60. The genitalia were normally developed.

The right leg had been amputated about four inches below the knee, and there was some ulceration of the weight-hearing surface of the stump. The left

The right leg had been amputated about four inches below the knee, and there was some ulceration of the weight-bearing surface of the stump. The left foot was grossly deformed and mutilated (Fig. 1), with nearly complete amputation of the first and third toes, partial amputation of the second and deformity of the others. Small spicules of bone protruded from the first and third toes with some ulceration of the surrounding skin. The skin of the foot was glazed and atrophic, with subcutaneous thickening but no edema. Areas of ulceration were present over the dorsum of the foot and behind the heel. In the dependent position the foot took on a cyanotic hue and the skin remained cold, although pulsation in the dorsalis pedis and posterior tibial arteries was readily palpable. The skin of the hands was dry and thickened and there was a peculiar blunting of the fingers. Colour and temperature in the hands was normal.

Neurological examination.—The cranial nerves, pupillary reflexes and fundi were normal. The motor system was intact with no evidence of muscle weakness or wasting. Percussion over individual muscle groups would elicit a contraction, but tendon reflexes were absent throughout except for a very weak response in the triceps bilaterally. Plantar stimulation elicited no response, but otherwise the superficial skin reflexes were all active.

Loss to light touch as elicited with cotton wool extended in a glove and stocking fashion from the elbows distally to the finger tips, and from just above the patellæ down to the toes. It was normal elsewhere. Skin pain as elicited by pin prick was indefinite over a small area on the cheeks, over the right side of the bridge of the nose, and over a small area on the anterior aspect of each shoulder. Its appreciation was diminished from the elbows to the wrists and surrounding the knees, completely lost distal to the wrists and below the knees. Where present in the extremities, reception was delayed from two to five seconds, the longer delay being in the more distal parts. It was accurate as to side. The lower third of the left leg and the foot were totally anæsthetic to all skin sensations. Appreciation of heat and cold was normal in the upper extremities, and in the lower except for the distal surface of the stump of the right leg, and the lower third of the left leg including the foot. Deep pressure pain was diminished in the distal parts of the extremities. Vibration sense was perhaps slightly diminished but appreciated in all limbs down to the mutilated toes. Position sense was absent at the wrists, fingers, ankle, and toes. There was complete astereognosis of the fingers and hands, the patient being totally unable to distinguish any objects placed in his hands, or tell when they were removed. There was slight ataxia of the arms and of the leg, but no asynergia. No tremor was

present. Sensation in the perianal region was normal. Laboratory studies.—Urinalysis, hæmoglobin, blood counts, sedimentation rate and blood calcium, phosphorus, sugar and non-protein nitrogen were all normal. Blood Kahn, Hinton and Eagle serological tests were negative. The cerebrospinal fluid was clear and gave normally graded manometric readings. On one occasion when the red cell count was 85 cells per c.mm., presumably from trauma, the Pandy test was faintly positive and the total protein was 125 mgm. A repeat examination disclosed 3 cells per c.mm., and negative globulin test. Kahn tests and colloidal gold curves were negative.

Roentgenograms of the left femur showed a fracture at the upper and middle thirds, which healed promptly with good callus. The cortex of the femur, tibia and fibula was selerotic and thickened, but there was no evidence of periosteal reaction. The phalanges of the left foot showed gross trophic changes with absorption of bone (Fig. 2) but those of the hands appeared normal.

Smears of discharges from open sores and a biopsy of the left third toe were negative for leprosy bacilli, the tissue showing some chronic inflammatory reaction, hyperkeratosis and obliteration of the vessels.

hyperkeratosis and obliteration of the vessels.

The general physical condition of the patient was fairly good, although weight-bearing on the broken limb was delayed for five months. Otherwise progress in hospital was uneventful. All areas of ulceration on the foot and stump had healed during the period that the patient was confined to bed.

CASE 2

P.R., a 24-year old male, brother of the preceding case was admitted to hospital on March 1, 1945, suffering from a disability similar to that of his brother.

History.—At about the age of 12 years this boy

History.—At about the age of 12 years this boy began to develop trophic changes in the feet, consisting essentially of infection about the toes with suppuration and subsequent loss of the nails. This process commenced in the great toe of the right foot and spread progressively to involve the other toes, recurring repeatedly over a period of years. At the age of 14 years he developed a perforating ulcer on the sole of the right foot, and three months later swelling and disorganization of the ankle, so that for the fol-

lowing two years he walked on an everted foot (Fig. 3). At this stage the leg was painless during the day when he was up and about, but ached and throbbed when weight bearing was removed. The limb was amputated below the knee in 1937. Meanwhile similar trophic changes developed in the left foot with recurrent paronychias, sinus formation and spontaneous amputation of the digits. One year ago a large perforating ulcer on the dorsum of the left foot was incised and drained, and there have since been many small ulcers on the sole of the foot. There also remained a trophic ulcer on the distal surface of the stump of the right leg, on which he had been wearing an artificial limb.

This patient had likewise noticed a numbness of the hands and fingers, present as long as he could remember. Small objects would continually fall from his hands and he was totally unable to feel or grasp loose coins in his pockets. Both hands had always been dulled to pain and although he could feel a cigarette burn, it was not as acutely painful as over the trunk or face. Outdoors the hands were somewhat sensitive to cold, while the feet had always been insensitive. He had no particular difficulty walking in the dark as long as he was on familiar ground, but would tend to stumble and stagger when going over new terrain, even in daylight. At the age of 8 years, he suffered a fracture of the left forearm and at the age of 12 years, a fracture of the right leg at the middle. There had never been any growing pains. Functional inquiry was negative. He was married in 1943 and has two children apparently normal in all respects. He is a heavy smoker, but only lightly inclined towards alcohol.

Physical examination.—He was an adult male of small stature, measuring five feet four inches and weighing 115 lb., but was otherwise well developed. An educational background as in the first case was noticeably absent, but he was nevertheless mentally bright and intelligent. The eyes, ears, nose and throat were negative except for absence of the upper front teeth, moderate caries and some gingivitis with loss of interdental papillæ. The superficial lymph nodes, thyroid gland, heart, lungs, and abdomen were normal, blood pressure 110/65 and heart rate 76.



Fig. 3 Fig. 4 Fig. 5

Fig. 3. (Case 2).—Lower extremities at the age of 17 years showing swelling and disorganization at the right ankle for which amputation was performed. (Courtesy Dr. L. O'N. Conroy, St. John's, Newfoundland). Fig. 4. (Case 2).—Deformed left foot showing loss of the great toe. The tarsal region is swollen with disorganization of the bony structure and rounding of the plantar arches. Fig. 5. (Case 2).—Roentgenogram of left foot. The tarsal bones illustrate pronounced trophic disintegration characteristic of a Charcot joint.

The right leg was amputated about five inches below the knee, and presented an elongated trophic ulcer on its distal surface. The left foot was grossly deformed (Fig. 4) with amputation of the great toe, loss of longitudinal and transverse arches and general disorganization of the tarsus. Grating of the tarsal bones could readily be felt. Several small ulcers were present over the sole of the foot. The skin of the foot was thin and glazed while that of the hands was thickened, and the fingers showed a blunting of their The dorsalis pedis and posterior tibial vessels were pulsatile. No temperature change was apparent in the hands, but the foot was always cold, and took on a cyanotic hue when in the dependent position.

Neurological examination.—The cranial nerves, pupils and fundi were normal. Superficial skin reflexes were all active with the exception of plantar stimulation which elicited no response. The motor system was intact and there was no atrophy of muscle groups. Tendon reflexes were absent except for a very sluggish response in the triceps on each side. Total loss to light touch extended distally in a glove-like distribution from the elbows, and from just below the knees, with an indefinite upper limit comprising a narrow area where it was dulled. Appreciation of skin pain was diminished at the wrists and lost over the hands and fingers, while on the lower extremities it was lost below the knees. Appreciation of heat and cold was preserved in the upper extremities, but was lost over the distal surface of the stump, and beyond the midpoint of the left leg. Deep pressure pain was diminished over a similar area to skin pain. The left lower limb was totally anæsthetic to all skin sensations

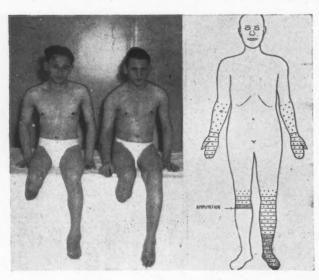


Fig. 6 Fig. 7

Fig. 6. (Cases 1 and 2).—Aged 22 and 24 years respectively. The similarity of the disease process in the two brothers is striking. Fig. 7.—Diagram showing the extent and distribution of sensory loss in cases 1 and 2. The dots indicate light touch, horizontal lines skin pain, and shaded areas temperature.

beyond the middle of the leg. Vibration sense was preserved in the upper limbs and in the left lower limb to the ankle, but lost below this level. Position sense was lost at the interphalangeal joints and inaccurate at the metacarpo-phalangeal joints, but preserved at the wrists. It was normal at the left ankle but not beyond. Ataxia was noticeable in all extremities, and all manipulations such as lacing boots, etc., were noticeably awkward, requiring close visual attention. There was no asynergia. Rombergism was present, and complete astereognosis in the hands.

Laboratory studies.—Urinalysis, hæmoglobin, blood counts, and sedimentation rate were all normal. Sero-

logical Kahn and Eagle tests on the blood were negarive. The cerebrospinal fluid was clear with normal pressure variations, cell count 2 per c.mm., negative Pandy test, protein 50 mgm., and a negative Kahn and colloidal gold curve. Smears of discharges from open sores were negative for lepra bacilli.

Roentgenograms of the left foot disclosed a relatively normal ankle joint, with typical neuropathic disorganization and fragmentation of the bones of the tarsus (Fig. 5). There was also an old healed fracture of the second metatarsal. The phalanges of the great toe were lost while the others showed early trophic changes. Roentgenograms of the chest and spine were

CASE 3

M.R., a girl of 11 years, was admitted on March 27, 1945, presenting a picture similar to the earlier life story of her brothers.

History.—She was a bright and intelligent young girl, having had to stop school in the third grade for two reasons. Firstly, she developed an infection around the nail of the left great toe, the nail having been lost at the time of admission. Several months previously the nail of the right great toe had been shed in a similar manner. Secondly, she found it difficult to write, because she was unable to hold a pencil between the first three fingers in the normal manner. However, she could write awkwardly with the pencil held between the second and third fingers, at the level of the proximal interphalangeal joint. She had always experienced great difficulty picking up small objects with her fingers, lacing her shoes, and buttoning her clothes, having to keep her eyes and attention constantly focused on the manipulation as she carried it out. This was attributed by herself to a numbness and lack of feeling in the fingers. Furthermore she was unable to run when it was dark because of a tendency to stumble over small stones and irregular ground. Other than this the past history

contained nothing of note.

Physical examination.—She appeared stunted, measuring 4 ft. 2½ in. and weighing 60 lb. The eyes, ears, nose and throat were normal, with no gingivities and a good dentition. The thyroid gland appeared in and a good dentition. The thyroid gland, superficial lymph nodes, heart, lungs and abdomen were negative, blood pressure 110/60. The upper extremities were normal, but there was pronounced lateral and some forward bowing of both tibiæ, with a sabre-shin appearance. The nail of the left great toe was missing, and there was some scarring and hyperkeratosis about the tips of the great toes. Otherwise the feet showed no changes. There was no evidence of muscle atrophy. The skin and hair were normal in texture and colour,

but there was definite thinning of the eyebrows. Neurological examination.—The cranial nerves, pupils and fundi were normal. The motor system was intact. Superficial skin reflexes were all active but no plantar response was elicited on ordinary stimulation. Of the tendon reflexes, the triceps was normal bilaterally and the biceps and pronator sluggish, while no response could be elicited at the knee or ankle. Light touch was symmetrically diminished in the lower third of the forearms, and lost in the hands and fingers. Likewise it was diminished over the lower third of the legs, and lost below the ankles. Elsewhere it was normal. Appreciation of skin pain was delayed in the distal parts of the arms and legs, and diminished in the fingers and terminal parts of the feet. It was particularly marked over the palmar and plantar aspects with complete loss in the great toes. The finer appreciation of temperature could not be tested, but she could readily differentiate between hot and cold throughout. Position sense was lost in the great toes and distal interphalangeal joints of the fingers, poorly appreciated in the other toes and at the proximal interphalangeal joints of the fingers. Vibration sense was normal. Stereognosis in the hands was diminished and although she was able to detect objects with a good degree of accuracy, it required considerable manipulation. The finger to nose test was fairly steady, but the heel to knee grossly unsteady and inaccurate. Rombergism was present with the eyes shut, and she walked with a characteristic gait, slapping her feet forcibly on the floor.

Laboratory studies.—The urine and blood pictures were normal. Blood Kahn and Eagle tests were negative. The cerebrospinal fluid was clear, pressure normal, cell count 2 per c.mm., Pandy test negative, protein 19 mgm., Kahn and colloidal curve negative.

mal, cell count 2 per c.mm., Pandy test negative, protein 19 mgm., Kahn and colloidal curve negative.

Observations on this patient while on large doses of thiamin and a high vitamin regimen disclosed no changes over a period of six weeks.

CASE 4

J.R., this had been the eldest boy of the family. He had died six years previously at the age of 37 years. At the time of his death the feet were grossly mutilated, the forepart of the tarsus having been amputated on each side. Prior to that he had a history similar to the two younger brothers with recurring infections, perforating ulcers and spontaneous amputation of small parts. Like the others he had difficulty in handling objects with his hands and fingers, but was able to master an accordion and play it fairly well. He had been unable to walk for about six years prior to his death, but managed to get around on his knees and with the aid of a dog cart.

Family history.—Exact data in regard to the family tree of these patients could not be obtained and the information available is not sufficiently accurate to give a complete picture of the background in these cases or to assess a possible hereditary factor. The mother and father were in the neighbourhood of 55 and 71 years of age respectively. Both were well and did not suffer from any major disability. There were twelve children, of whom four were more or less similarly affected. None of the children of the married members of the family displayed any apparent neurological disorder, although many of them lived together under the same Their social and roof, for years at a time. economic status was desperately inadequate, with minor nutritional deficiency evident in all the children to some extent. No reliable information could be obtained regarding the family history of the mother and father except that no other cases of this type were known to them.

DISCUSSION

The syndrome typified by these cases presents very definite and constant neurological features that do not readily permit their inclusion in any of the commonly described neurotrophic disorders. The symptomatology is sufficiently characteristic that the course of the disease can be clearly outlined.

In this instance it was familial, occurring in both sexes. Symptoms began in early childhood, being evidenced by a sense of numbness and lack of sensation in the hands and feet, together with diminished appreciation of painful stimuli. The

finer movements of the fingers became clumsy and awkward, writing was difficult, and the patients tended to stumble and fall abnormally. At about the age of 10 to 14 years trophic changes made their appearance and continued progressively in the form of recurring suppurative lesions about the toes, sinus formation, painless perforating ulcers and eventual mutilation of the feet. No severe neuropathic changes occurred in the hands other than some hyperkeratosis of the skin and nails, and blunting of the terminal parts of the fingers. Pathological fractures were common during the course of the disease. This was the picture in the three boys affected, and it seems probable that the girl will follow through the same stages.

The essential neurological picture is one of a symmetrical sensory disturbance (Fig. 7) involving the four extremities in a glove and stocking distribution, extending peripherally from the elbows and knees, or below this level in the less advanced case, and being more marked distally Touch was affected to the than centrally. greatest degree, followed closely by skin pain, with temperature appreciation the least im-Skin reflexes, with the exception of the plantar, were maintained while the tendon reflexes were diminished or absent. Joint and position sense in the distal parts of the extremities was diminished or lost with astereognosis and some ataxia. Vibration sense was for the most part retained although it was diminished.

Palpable changes in the peripheral nerves could not be demonstrated, and muscle atrophy, pupillary changes, or other signs of central involvement were noticeably absent. Examinations of the blood and spinal fluid were negative. Roentgenograms in the late stages showed a characteristic neurotrophic osteopathy in the bones of the feet, with early loss of tufting in the terminal digits, osteoporotic and osteosclerotic changes, old fractures, fragmentation of bone and fuzziness in outline. Although there was evidence of diminished circulation with coldness of the lower extremities, this seemed to be part of the neuropathic picture, and typical vasomotor disturbances were lacking.

Several conditions can give a clinical picture closely resembling that just described, of which syphilis of the central nervous system, leprosy, syringomyelia and Morvan's disease require special consideration.

Pathologically tabes dorsalis is to be regarded as a systemic disease with degeneration of the sensory neurons in the region of the posterior nerve roots as they enter the spinal cord. Loss of tendon reflexes and disturbances of superficial and deep sensibility, with delay in appreciation of stimuli are common findings, but these follow a segmental distribution. Trophic disturbances involving the skin, joints and bone also occur in the late phases of the disease. Moreover, many instances of familial tabes have been described. Consideration of tabes however is untenable in the absence of radicular irritative phenomena and pupillary changes, preservation of the abdominal and cremasteric reflexes, and negative serological findings in the blood and spinal fluid of all cases even in the active stage of the disease.

The neural form of leprosy offers a distinct problem in differential diagnosis and had been seriously considered. However, it has not been known to exist in Newfoundland, while smears of discharges and a biopsy of a deformed toe were negative for lepra bacilli. There were none of the characteristic pigmentary changes in the skin nor any nodular thickening of nerve trunks so frequently observed in that disease.

Syringomyelia is perhaps the most difficult to eliminate, but here again many features would seem to make this diagnosis unlikely. The most characteristic finding, viz.: dissociated anæsthesia with loss of appreciation of pain and temperature, and preservation of touch and the various forms of deep sensibility, is not present in the cases described. Likewise segmental distribution of the sensory changes, muscle atrophy and signs of lateral column involvement are characteristically absent. The variety commonly called Morvan's disease bears the closest resemblance, with symmetrical loss of all forms of sensibility occurring in the hands and often in the feet distal to the wrists and ankles. Many variations of the disease have been described. but there is usually peripheral pain in the early stages and progressive atrophy of the intrinsic muscles of the hands and feet. Pupillary changes, spinal curvatures and other signs may also be present, all of which point to a cord

Parks and Staples¹ in their review of the literature were able to collect seven cases under "Morvan's disease occurring in children" and added two of their own, which while not all identical, yet displayed a clinical picture closely resembling one another. Their similarity with the cases described in this report lies in the fact that symmetrical impairment of sensibility in

the distal parts of the extremities with late trophic changes were the fundamental feature in all, while muscle weakness or atrophy, and evidence of involvement of the upper motor neurons or lateral columns of the cord were characteristically absent. There were no autopsy reports.

The problem of differential diagnosis in this group of cases is most difficult, and in the absence of necropsy material the underlying pathology must remain obscure. Syringomyelia cannot be ruled out at the present time but such a lesion of the spinal cord seems most improbable and is not supported by the neurological findings. A peripheral neuropathy affecting selectively the afferent nerve fibres would undoubtedly conform more accurately with the clinical picture, whether it be infective, toxic or degenerative. Microscopic sections taken from Case 1, showed marked degeneration of the peripheral nerves in the amputated limb with severe demvelination greatly out of proportion to the mild chronic inflammatory changes in the surrounding tissues. Although the four cases described occurred in one family with a very similar course, there is no definite evidence of any hereditary factor in the parental background. The possibility of a nutritional deficiency might bear further investigation and should be con-All members of this family though sidered. physically well developed, demonstrated to some degree evidence of dietary lack, in the form of widespread dental caries, gingivitis, stunted stature and childhood rickets.

SUMMARY

The clinical picture of an unusual neuropathy has been described, having as its main feature severe peripheral sensory disturbances in the arms and legs. The skin sensation of touch and pain were affected to the greatest extent while temperature appreciation was the least impaired. Deep sensibility in the bones and joints was diminished or lost peripherally. Trophic changes made their appearance late in the course of the disease and though present to some degree in all four limbs were most profound in the lower extremities. The syndrome has been illustrated by detailed observation in three cases, and a brief outline of a fourth, all occurring in one family. It resembles closely the syndrome of Morvan's disease and might ordinarily be included under this title, but this diagnosis does not seem justified if Morvan's disease is to be retained for a variety of syringomyelia. It is an obscure disease, the underlying pathology of which is unknown, but a central lesion such as occurs in syringomyelia is not substantiated on clinical grounds. Further study of this most interesting condition, particularly of necropsy material, will be essential before it is fully understood.

The author wishes to express thanks to Dr. Eric A. Linell, Professor of Neuropathology, University of Toronto; Capt. M. F. Driggs, Medical Department, U.S. Army, and to F./L. H. A. Bird, Medical Branch, R.C.A.F., for valuable criticism and assistance in the preparation of this report, as well as to Dr. L. O'N. Conroy, St. John's, Newfoundland, for permission to use the illustration in Fig. 2.

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TRANS-PYLORIC PROLAPSE OF REDUNDANT GASTRIC MUCOSAL FOLDS

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PROLAPSE of redundant folds of the gastric mucous membrane into the duodenum, while hitherto not recognized as frequently as prolapse of pedunculated tumours through the pyloric ring, should not be considered a rare lesion. It probably occurs more frequently than is suggested by the relatively scanty literature on the subject. Melamed and Hiller in 1943 were able to collect only 20 verified cases in their survey, including one of their own. 1 Scott² who has stimulated our interest in this problem recently reported 14 cases, an incidence of 1.04% in a series of 1,346 successive gastro-intestinal x-ray examinations. In 5 of these there was confirmation by operation. The purpose of this paper is to add to the series 2 cases, both confirmed surgically, and to direct additional attention to this apparent entity.

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Pedunculated tumours, both benign and malignant, have long been known to prolapse from time to time through the pylorus into the duodenum. Occasionally one may come across cases simulating the same condition where there is no real tumour formation but only hypertrophic or redundant mucosal folds which are large enough to prolapse in the same fashion. It is evident that such an abnormal formation may cause symptoms.

In recent months two cases of trans-pyloric prolapse of redundant gastric mucosal folds have been observed at operation in the Royal Canadian Naval Hospital of Halifax. Before discussing this condition in detail we would like to present those two cases.

CASE 1

G.F.G., 29 year old stoker, has been perfectly well until February 1944, when he began to feel discomfort after meals. This was in the form of gas belching and a feeling of fulness behind the sternum with occasional regurgitation. At first this was present only occasionally, but for several months before admission on October 25, 1945, it had occurred after every meal. Belching relieved the symptoms to some extent but ingestion of food or soda did not. There was frequent regurgitation, but no vomiting or melena.

The physical examination was essentially negative. The laboratory findings were not significant. The blood picture was normal. No occult blood was found in the stools. Analysis of gastric secretion, following stimulation with 7% alcohol, yielded normal acid levels.

Roentgenologically, prior to admission to hospital, on October 16, 1944, a small rounded defect was noted in the base of the duodenal cap on the lesser curvature side, suggesting a polyp. On November 6, re-examination showed that the duodenal cap and the prepyloric area of the stomach, on the lesser curvature side, were not filling properly. Radiographs demonstrated a minimal sharply circumscribed and rounded defect in the prepyloric region of the stomach thought to be due to polyp formation (Figs. 1 and 2).

At operation, on November 11, before the stomach was opened, a small tissue mass could be displaced by palpation from stomach to duodenum and back again. Opening of the stomach and duodenum revealed the presence of a large redundant mucosal fold of healthy mucous membrane 7.0 x 2.5 x 1.0 cm. It was attached almost transversely to the posterior wall and lesser curvature of the antrum immediately proximal to the pyloric ring. The pyloric aperture was normal and the pyloric muscle of normal consistency. Resection of the mucosal fold was carried out. The mucosal margins were approximated and, fixed to the underlying muscularis. To ensure patency of the pyloric canal the longitudinal incision was closed transversely as a pyloroplasty (Figs. 3 and 4).

The pathologist reported redundant gastric mucous membrane without evidence of ulceration or malignancy.

CASE 2

J.T., 48-year old officer, was admitted to R.C.N. Hospital, Halifax, on November 24, 1944, for investigation of a deformity of the prepyloric region of the stomach. This had been a constant finding in three successive x-ray examinations during the preceding six weeks. The first of these was made on October 18, 1944, and demonstrated also a gastric ulcer on the lesser curvature of the stomach. Prior to 1934 he had an occasional bout of indigestion but from then until September 1944 he was completely symptom-free. At



Fig. 1

Fig. 1 (Case 1).—Film taken in right anterior oblique decubits showing a rounded filling defect in the base of the cap giving the "polypoid" appearance. Fig. 2. (Case 1).—(a) Detail film of the prepylorus made with marked pressure demonstrating rounded defect and gastric rugæ running in every direction.

(b) Film made with moderate pressure showing the same features as in (a) and also a defect in the base of the cap on the lesser curvature side. (c) Film taken with slight pressure showing defects both in the base of the cap and the prepylorus on the lesser curvature side. (Note the concave line of the base of the cap.)

this time, epigastric pain appeared at the hunger period, and more occasionally after meals. Gas belching was present but no nausea. The gastric ulcer responded very well to ambulatory medical management and was completely healed roentgenologically on November 8, 1944. Nevertheless, one perturbing feature remained. In the above mentioned and subsequent fluoroscopic examinations, with and without the administration of atropine, there was a constant narrowing in the prepyloric region. This would not distend normally in spite of active peristaltic waves passing through the area. It was impossible to differentiate between abnormality of the mucous membrane and a very early new growth (Figs. 5, 6 and 7).

The physical examination was not remarkable. The blood picture was normal. There was no occult blood in the stools. Gastric analysis: fasting secretion 50 c.c., with no free HCl. Alcohol stimulation failed to provoke free acid, but histamine produced 30 units of free HCl 30 minutes after injection.

At operation, palpation of the duodenum and antrum together readily revealed a tumour which could be passed back and forth between the prepyloric region and the duodenum. This could actually be demonstrated, before opening the stomach to those observing in the theatre. A longitudinal incision into the antrum and proximal duodenum disclosed a redundant fold of mucous membrane attached to the posterior wall and lesser curvature near the pyloric aperture. The pyloric ring was thickened somewhat but the lumen was not markedly diminished. The redundant mucosal fold was excised, and the marginal folds of mucosa approximated and fixed to underlying muscle. Examination of the lesser curvature displayed no evidence of the previously demonstrated gastric ulcer. The longitudinal incision was closed transversely as a pyloroplasty.

The pathological report read: "Gross and histological

The pathological report read: "Gross and histological appearances reveal a redundant portion of gastric mucosa, some hæmorrhage and simple inflammatory change. No evidence of malignancy".



Fig. 3. (Case 1).—Post-pyloroplasty film following resection of the redundant gastric mucosal fold. Some deformity is present in the operation area, but there is no pyloric obstruction.



Fig. 4. (Case 1).—At a later date postoperatively, the pyloric region is broad and patent, barium flowing through readily. No localized tenderness was found. Excellent functioning result.

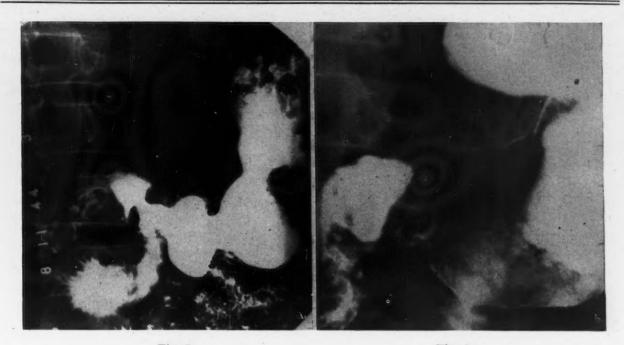


Fig. 5. (Case 2).—(a) Outline of stomach and duodenum with definite prepyloric narrowing, broad pylorus and discreet concave outline of the base of the cap. Fig. 6. (Case 2).—(b) Double contrast of lower pylorus and gastric body showing narrowing of the prepylorus and excessive vertical rugæ.

ETIOLOGY

The etiology of this condition is obscure. Many hypotheses have been put forward to try to explain its production. Eliason, Pendergrass and Wright³ suggested the origin to be a low-grade inflammatory process, giving rise to hypertrophy of the mucosa. They conceived these hypertrophied folds to be caught and dragged towards the pylorus by peristalsis, eventually becoming so elongated as to protrude into the duodenum.

Rees⁴ is of the opinion that narrowing of the pyloric aperture precedes any change in the gastric mucosa. The stomach in an effort to

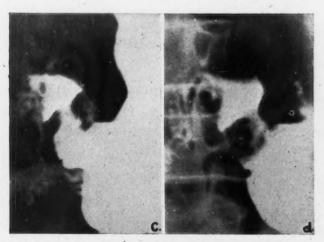


Fig. 7. (Case 2).—(c) Pyloric narrowing with some suggestion of a small prepyloric crater. (d) Same, showing unusual mucosal pattern and filling defect due to redundant mucosal fold.

force gastric content through the narrowed pyloric lumen exhibits hyperperistalsis. He believes this increase in stomach action causes loosening from the muscularis mucosa of the pyloric mucous membrane and, in turn, of the antral mucosa. These loose folds of mucosa are caught in the peristaltic waves, become hypertrophic in time, and then essentially tend to prolapse.

Moersch and Weir⁵ feel that redundant gastric mucosa can best be considered a manifestation of a developmental anomaly. They think as Rees does that the gastritis associated with these lesions is a secondary process.

Golden⁶ points out that normally the mucous membrane of the stomach is freely movable over the muscle and, as shown by Forssell, the formation of mucosal folds is the result of independent contraction of the muscularis mucosa. This movement is dependent, therefore, on the mobility of the mucous membrane and the integrity of the muscularis mucosa. When these are interfered with by gastritis there is a failure on the part of the mucous membrane to undergo the stretching and retraction away from the pylorus that is believed to occur normally during antral systole. Then the gastric folds become predominantly oriented at right angles to the long axis of the stomach, closely packed together. Repeated antral contractions acting on these crowded folds eventually produce redundancy and jamming toward the pylorus.

The rôle of emotional factors in causing gastric dysfunction is emphasized by Scott² as, possibly, an important mechanism in the production of redundant mucosa. It is of interest too that a search for evidence of excessive mobility of the gastric mucosa, sufficient to permit its traction by forceps through the pylorus, was found in only 1 of 126 stomachs at autopsy.

The two cases now reported lend little to support Eliason and Wright because very little gastritis was present in the redundant folds excised in Case 2 and none at all in Case 1. Rees' theory of pre-existing narrowing of the pyloric ring has some support in the literature but in only one of our cases was there any pyloric thickening and this was unaccompanied by any significant change in the size of the pyloric lumen. In retrospect, it is possible that psychosomatic factors operated in both cases.

SYMPTOMATOLOGY

There does not appear to be any characteristic clinical syndrome to identify this condition. The most constant symptom described has been vague upper abdominal distress. Rees emphasized the features of partial obstruction with distress after meals. Case 1 exhibited symptoms consistent with reflex tonus changes suggestive of interference with gastric emptying. However, these are indistinguishable from a functional dyspepsia.

Theoretically, symptoms should be more marked in right side decubitus, since it is in this position that prolapse occurs more readily. The frequency and importance of anæmia have been emphasized by many observers but it was not found in either of our cases. Frank hæmorrhages, one from the rectum and one from the mouth, have been reported in two of the cases in the series of Archer and Cooper.⁷

Roentgenologists have long been aware of this condition and roentgen examination has been the most important aid in the diagnosis. In case 1 the radiologist suggested the diagnosis of a tumour prolapsing through the pylorus. In the light of recent reports that is as far as one should go, although at one time Pendergrass thought he could differentiate between simple prolapsing mucous membrane and protruding polyp. Later he expressed the opinion

that this distinction could not always be made. In case 2 a constant deformity of the prepyloric region was described which could not be labelled definitely benign. The patient was 48 years of age and, in view of this, it was felt that he should be explored.

ROENTGENOLOGICAL STUDY

The diagnosis of prolapsing mucosal folds is essentially made by fluoroscopic and radiographic examination. Obviously, a varying degree of redundancy of the mucosal folds may exist and the chances of making the diagnosis roentgenologically must vary accordingly. The point that comes up immediately is whether or not early recognition of a redundant gastric mucosa is possible by x-ray examination. In other words could the abnormal redundancy of the gastric mucosa be detected in the preprolapsing stage? It is our impression that, at the earliest stage, even with a careful study of the gastric rugæ with a thin coating of barium one could hardly do better than identify a certain hypertrophy of the rugal pattern. At a later stage, when there is not only redundancy but also slight loosening of the mucous membrane in the pyloric canal it is possible to see some radiation of the mucosal folds extending from the periphery of the base of the duodenal cap into the pylorus, with minimal pooling of barium at the point of convergence of the folds. This appearance is relatively often seen and frequently confused with that of an ulcer.

The important point is to be familiar with the roentgenological picture that may be given by a redundant gastric fold at the true prolapsing stage. Two entirely different types of x-ray appearance may be observed in this condition: (a) the polypoid and (b) the "pyloric narrowing" appearance.

In the majority of the reported cases, as in Case 1, it is is the polypoid appearance which is found. The redundant mucosal fold is responsible for an abnormal appearance of the gastric rugæ in the prepyloric area. The rugæ seem to be more prominent than usual and appear to lack the usual pattern, being oriented in every possible direction, even in a circular fashion, instead of running horizontally and vertically. In the base of the duodenal cap a rounded defect is noted and, with pressure over the defect, curved mucosal folds running parallel to the

outline of the base of the cap may be seen. When the prepylorus and cap are completely filled with barium, more or less rounded defects may be visible in each segment alternately or at the same time. The base of the cap, instead of looking flat, presents a concave appearance, the concavity facing the pyloric canal which may seem to be slightly elongated. Although these findings may be best observed in prone decubitus according to many authors, they may be well demonstrated in upright also, as in Case 1, especially if compression is used. The lesion may be easily missed fluoroscopically but should be diagnosed on the films.

In a small number of cases, as in Case 2, redundant prepyloric mucosa may produce in the stomach and duodenal cap a fairly different roentgenological aspect, that of narrowing at the level of the pyloric antrum. There are not many references in the literature to this type. In spite of the constant and persistent narrowing of the prepyloric region of the stomach, the appearance is not that of a true stenosis. appears rather as a definite diminution of calibre without appreciable interference with passage of the peristaltic waves, and without secondary dilatation of the stomach. The pylorus itself seems to be moderately elongated and perhaps broader than usual. The base of the cap may show a concave outline with or without definite filling defect as in the previous type. The mucosal pattern seems difficult to observe, but with pressure or else in supine decubitus one may sometimes visualize a localized area of redundancy in the prepyloric ruge. A six hour residue has been reported in some cases.

The differential diagnosis is important. Pendergrass and Andrews⁸ write that one cannot make a definite diagnosis between a polyp or any other type of tumour protruding through the pylorus and a redundant mucosal fold. So they advocate the mere roentgenological diagnosis of a "prolapsing lesion". The same authors also call attention to a certain number of other conditions such as hypertrophy of the pyloric muscle and extra-gastric anomalies which may simulate the appearance of a prolapsing lesion. In the cases where narrowing of the prepylorus is present, it may be impossible to differentiate the lesion from an early carcinoma.

Kirklin and Harris,⁹ and after them Cunha,¹⁰ have listed other pyloric conditions which must be differentiated from carcinoma, namely, simple benign pyloric hypertrophy, secondary hyper-

trophic pyloritis associated with pyloric stenosis, simple antral spasm, gastric syphilis, multiple polypi at the pylorus, pyloric or prepyloric ulcer with marked peri-ulcerative infiltration and circular myoma. As already mentioned, a redundant mucosa may occasionally lead to the false diagnosis of pyloric ulcer. But it must also be known that superimposed pathological changes may take place in prolapsing mucosal folds. Rubin reported one case with proved malignant changes, while Melamed and Hiller¹ reported another with a large ulcer crater.

TREATMENT

Initially, it was believed that surgical exploration of the stomach should be made in every instance in which a prolapsing lesion was demonstrated radiologically. This was based on the supposition that it would always be difficult to rule out with certainty the possibility of actual malignant disease or of lesions which might later become malignant. During the six months following the study of the two cases now reported, an additional seven have been encountered, none of which has seemed to warrant surgical opera-In these, the x-ray findings indicated fairly convincingly a redundant mucous membrane rather than a new growth formation. In one instance the x-ray appearance had remained unchanged over a two year period and could not be correlated with the patient's complaints. In another, there were cogent psychological reasons for avoiding a surgical procedure. In no one of these was there evidence of bleeding, pyloric obstruction or suspicion of new growth,—any one of which should call for operative exploration. Such factors as age, family history and the finding of persistent achlorhydria would undoubtedly influence one towards surgery.

As this subject receives further attention it is believed that criteria will be evolved to permit the radiological differentiation, in many cases at least, of redundant mucosal folds from polypoid lesions, whether or not there be transpyloric prolapse. Gastroscopy, in certain cases, may assist in this distinction.

When at operation a redundant, prolapsing mucosa is found it is generally agreed that excision of the affected fold is essential in every case. Eliason³ has emphasized two important points to be borne in mind when operating upon a patient in whom this lesion is suspected: (1) The stomach and duodenum should be palpated simultaneously to avoid slipping away of the

tumour from the examiner's fingers, through the pylorus. (2) The stomach should always be opened to rule out the presence of a redundant fold, as well as other lesions that may not be palpable through the gastric wall.

Two procedures have been advocated in the literature either to correct co-existing narrowing of the pyloric aperture or to avoid postoperative contracture which might arise after excision of the redundant mucosal fold. In those cases where rigidity of the pyloric ring and diminution of the pyloric lumen accompanied the redundant mucosa, Rees4 applied the principles of the Fredet-Ramstedt operation, with a small longitudinal incision down to the mucosa. Most other operators have performed a pyloroplasty after excision of the prolapsing mucous membrane. The plastic procedure consisted in most cases of closing transversely a longitudinal incision. In Case 2 the method of Rees could have been used and would in all probability have produced an equally good However, in Case 1 there was no rigidity of the pyloric ring or decrease in the size of the pyloric aperture, so the Rees method would not have been applicable. Thus it would appear that pyloroplasty as described has a wider range of application, adds little to the risk and ensures adequate functional result.

From a medical standpoint any measure would be useful which would reduce mucous membrane engorgement and muscular hypertonus. The use of a bland diet should theoretically, be of value, together with the avoidance of frustration and resentment—states which produce the "red reaction" of Wolf and Wolff.¹²

SUMMARY

- 1. Two cases of trans-pyloric prolapse of redundant gastric mucosal folds, proved by operation, are described.
- 2. Some of the theories of pathogenesis have been reviewed. They postulate, for the most part, a pre-existing gastritis or an interference with the neuro-muscular mechanism underlying movements of the mucous membrane.
- 3. As yet there is no pathognomonic clinical picture. The symptoms are those of vague gastric disturbance and usually fail to fit into any of the known alimentary tract syndromes.
- 4. The diagnosis is essentially roentgenological. The x-ray appearance is variable depending upon the degree of redundancy and prolapse.

The *polypoid* appearance probably is the most frequently encountered and is the easiest to identify. The *pyloric narrowing* type is almost impossible to differentiate completely from a score of other conditions which may also diminish the calibre of the prepylorus.

- 5. There is no specific medical treatment. Theoretically, dietary and psychotherapeutic measures tending to reduce mucosal engorgement and muscular hypertonus would be in order.
- 6. The positive indications for surgery are three-fold: (a) Equivocal x-ray signs—where polyp or other type of new growth cannot be excluded. (b) Continued bleeding. (c) Evidence of pyloric obstruction—clinically, or by x-ray.

The patient's age, temperament, family history or the presence of achlorhydria, may bear on the question of operation. When decided upon the latter must include inspection of the interior of both stomach and duodenal bulb. Resection of the redundant and prolapsing fold, and closure by pyloroplasty, are advocated.

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We Englishmen have every reason to be proud of our fellowcountrymen. To take philosophers and men of science only Bacon and Hobbes, Locke and Berkeley, Hume and Hamilton, will always be associated with the progress of human thought; Newton with gravitation; Adam Smith with political economy; Young with the undulatory theory of light; Herschel with the discovery of Uranus and the study of the star depths; Lord Worcester, Trevethick, and Watt with the steam-engine; Wheatstone with the electric telegraph; Jenner with the banishment of smallpox; Simpson with the practical application of anæsthetics, and Darwin with the creation of modern natural history. Such men as these have made our history and moulded our opinions; and, though during life, they may have occupied, comparatively, an insignificant space in the eyes of their countrymen, they became at length an irresistible power, and have now grown to a glorious memory.—Sir John Lubbock.

POSTOPERATIVE EARLY RISING

By Frank B. Thomson, M.D.*

Toronto

EARLY rising following celiotomy has been discussed frequently in the recent surgical literature. First practised successfully by Ries over forty years ago, the method received little attention until the late 1920's when articles on the subject began to appear in foreign journals. These authors, almost without exception, were impressed by the advantages of the method. More recently, Leithauser, Newburger, Powers and Ashkins have written in American journals of their favourable experiences with postoperative early rising.

On the basis of recorded experience it was decided to institute a postoperative early rising program at Trenton and St. Thomas R.C.A.F. Hospitals. With the consent and advice of Wing Commander R. C. Laird, the following routine was adopted:

TABLE I.

(A) Day of operation: (i) 5 p.m.—morphia gr. 1/6.
(ii) 5.30 p.m.—assisted out of bed by nurse who has patient cough until palpable râles are gone. (iii) Walk around foot of bed once only. (iv) Void while standing.

Po	(B) estoperative day	Time o a.m.	ut of bed p.m.	Void standing	Bathroom privileges
	1	5 min.	5 min.	Yes	No
	2	15 min.	15 min.	Yes	No
	3	30 min.	30 min.	Yes	No
	4	1 hr.	1 hr.	Yes	Yes
	5	2 hr.	2 hr.	Yes	Yes
	6	21/6 hr.	21/2 hr.	Yes	Yes
	7	3 hr.	3 hr.	Yes	Yes
	8	4 hr.	4 hr.	Yes	Yes
	9	Up full ti	me.		

Between November 1944 and June 1945, 79 herniotomies, 16 appendectomies and 2 chole-cystectomies were treated by this method at R.C.A.F. hospitals at Trenton and St. Thomas, Ontario. These cases were nearly all under 30 years of age. Spinal anæsthesia was used in all cases. The postoperative course of each case was followed and the incidence of catheterization, cramps, headache, wound infection, respiratory infection, etc., were recorded. Questionnaires were sent to medical officers caring for these cases during the convalescent period.

Results.—A summary of the salient features of the postoperative period is given in the following table.

DISCUSSION OF RESULTS

A. Postoperative period.—Pain in the incision was never severe and did not prevent the continuation of early rising in any case. The patient's initial apprehension is dispelled by seeing his fellow patients get up early. After getting up the first time himself, apprehension is replaced by enthusiasm. The morale of the patient is much higher than when on full bed rest. The performance of bowel and bladder

TABLE II.
POSTOPERATIVE COURSE

Postoperative course	Herni- otomies	Appen- dectomies	Cholecys- tectomies	Total
Pain:				
Moderate	12	6	1	19
Marked	0	0	0	0
Catheterized	6	1	0	7
Using bedpan	9	1	1	11
Needing enemata	1	1	0	2
Abdominal cramps:				
Moderate	4	2	1	7
Marked	3	0	0	3
Headache:				
Less than 48 hrs.	2	3	0	5
More than 48 hrs.	13	2	1	16
Pulmonary atelec-		,		
tasis	1	. 0	0	1
Bronchopneumonia	0	0	1	1
Wound infection	0	1 +	0	1
Total number of		4		
cases	79	16	2	97

functions in a normal manner is greatly facilitated by postoperative early rising. Catheterizations, bedpans and enemata are needed much less frequently. This also stimulates morale, reduces the work of the ward staff, and makes the need for special duty nurses less frequent and less prolonged.

Abdominal cramps of clinical significance were unusual, linseed poultices and rectal tubes were rarely in evidence on the ward. Headache lasting over 48 hours occurred in 16 cases. It was necessary to discontinue the routine in these cases and institute full time bed care.

Serious postoperative respiratory infection was rare despite the fact that the cases were operated on during the winter months with many upper respiratory infections in preoperative cases on the ward. Early rising has been

^{*} Formerly Squadron-Leader, R.C.A.F.

found by several authors to maintain the vital capacity at a more nearly normal level during the postoperative period. This and the early coughing of mucus from trachea and bronchi assist in preventing atelectasis and respiratory tract infections. The wounds healed normally and showed no undue tenderness or weakness. One subcutaneous infection occurred in a case of acute gangrenous appendicitis.

The length of time spent in an active treatment hospital by postoperative celiotomy cases of the type discussed in this paper may be reduced by adopting the postoperative early rising routine. It was observed that these patients were able to walk about the ward without discomfort by the third or fourth postoperative day. The asthenia and weakness of the legs present after full bed rest for 7 to 21 days does not occur. By the fifth day they were up four hours a day, used the bathroom and needed no special nursing care. The patients were fit at that time for transfer by ambulance to a convalescent hospital where they could spend a part of the next few days in bed and have their stitches removed. These service cases were retained at an active treatment hospital for approximately 14 days postoperatively, however, first because of service regulations, second in order that the full postoperative course might be observed. From observation of these cases I feel that the intelligent patient of this type in civilian practice could go home by ambulance on the fifth postoperative day there to spend part of the next three days in bed and return on the ninth postoperative day for removal of stitches. This would save the patient money and enable the hospital to handle a greater number of postoperative patients with the same number

B. Convalescent period.—Medical officers at R.C.A.F. convalescent and R.C.A.M.C. reconditioning centres reported that these patients were in better physical condition on arrival, had a better morale, and absorbed the reconditioning program faster than other patients. The progress of these cases was such that sedentary work could be done without discomfort 10 days after appendectomy and 14 days after herniotomy.

The incidence of hernial recurrence and incisional hernia will only be known after follow-up in two years' time. There is no indication from their course to date that this will be any higher than that for cases treated by postoperative bed rest.

SUMMARY

Ninety-seven celiotomy cases all under 30 years of age, were treated by postoperative early rising. The immediate postoperative and convalescent periods are discussed and the advantages of early postoperative rising are noted.

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RÉSUMÉ

97 cas d'opérations abdominales, tous âgés de moins de 30 ans, ont été soumis au lever précoce. Sauf lorsque le besoin de reprendre le lit fut impérieux tous les malades ont observé le lever précoce et l'ont bien supporté. La convalescence a été très abrégée, le moral a été meilleur et la récupération physique a été plus rapide. La méthode comporte des avantages très nets et doit être mise en œuvre quand rien ne la contreindique. JEAN SAUCIER

THE USE OF ALDARSONE IN THE TREATMENT OF NEURO-SYPHILIS*

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ALDARSONE, a pentavalent arsenical, is a condensation product of 3-amino-4 hydroxylphenylarsonic acid with sodium formaldehyde sulfoxylate. It is a white crystalline powder containing about 17% arsenic and readily soluble in water. The aqueous solution has a pH of about 7.6. For use the drug is dissolved in 10 c.c. of sterile freshly distilled water, the initial dose being 0.25 gm., increasing to a maximum of 1 gm.

According to the experimental evidence of Raiziss and his co-workers1 who published their original work in 1934, aldarsone has a spirochætal power superior to that of tryparsamide. The first clinical study of aldarsone was made by Kamman² in 1938 with encouraging results. In 1941 Spiegel, Liefer and Sarason³ reported their findings in a larger group of patients followed for a more prolonged interval. In 1944, Bennett, Morrison and Modlin' reported their impression of the use of aldarsone in conjunction with fever therapy. Many of the larger

^{*} Read at the Seventy-sixth Annual Meeting of the Canadian Medical Association, Section of Dermatology, Montreal, June 14, 1945.





clinics in the United States have conceded its usefulness because of its relative lack of toxicity.

The drug was introduced into the Victoria Hospital venereal disease clinic, in 1939 and most of the material for this presentation has been derived from this source. It was felt that further studies and more prolonged observation periods were required to evaluate the drug. The observations reported in this paper relate to the treatment of 54 patients who were given 2,176 injections of the drug. The largest number of injections given to any one patient was 140; the oldest patient was 78 years of age and the youngest 14 years of age. For convenience of discussion the cases have been divided into three groups as follows: (1) Aldarsone combined with fever therapy.* (2) Aldarsone plus other chemotherapy. (3) Aldarsone alone.

GROUP I.

Thirty-six patients, the majority of whom had previously received routine therapy, were treated with aldarsone combined with fever therapy. The drug was not administered at the height of the fever as it was felt there would be an increased danger of damage to the optic nerve. Mapharsen was given at the height of fever in conjunction with aldarsone therapy in a few cases. In most cases, 10 injections of aldarsone preceded fever therapy, followed by 10 exposures of fever with a total of 70 hours at 105° with the drug administered in the mid-week interval. In addition, 2 grains of bismuth salicylate were administered to the patients while in the cabinet. A rest period of one month was then advised, followed by continuation of aldarsone therapy in courses of 20 injections.

The results of the nervous system involvement with emphasis on the particular part involved are briefly summarized as follows:

(a) Asymptomatic neuro-syphilis.—Five cases receiving an average of 50 injections of aldarsone in conjunction with fever therapy were negative both clinically and serologically after an observation period of three to five years. An additional patient followed for the past two years, showed

no improvement in spinal fluid serology. Two cases receiving 40 injections were negative after one year following fever therapy.

(b) Dementia paralytica.—Of nine patients (well advanced) who received artificial fever plus an average of 43 injections of aldarsone and followed for an observation period of four years, three showed no response in their mental condition but two improved physically, three had partial remissions and three had complete remissions. Three dementia paralytica patients (early) treated in the same manner were symptom-free with negative spinal fluids but two gave moderate Wassermann reactions.

(c) Tabo-paresis.—Five patients received an average of 57 injections of aldarsone and were observed for a period of four years following fever. Tabetic symptoms of lightning pains were markedly reduced in one case but spinal fluid Wassermann remained moderately positive. One patient developed a Charcot's joint under treatment and mental symptoms progressed. Two cases showed marked improvement in their cord and cerebral involvement and spinal fluid tests. A far advanced tabo-paretic patient, bedridden, with non-intelligible speech and mental deterioration, improved clinically in all respects but serologically there was little change.

(d) Tabes dorsalis.—Three cases with predominating symptoms of gastric crises were completely relieved with combined aldarsone and fever therapy. Another case receiving 40 injections of aldarsone, developed an exfoliative dermatitis, necessitating cessation of the arsenical, followed by an acute gastric crisis one year later, relieved by fever therapy. Two patients with cord bladders (total retention) made complete recoveries with no return of symptoms during four years of observation. Two cases of ataxia, combining fever treatment with an average of 60 injections of aldarsone showed a marked improvement in co-ordination. others, which were actively progressing, remained stationary after treatment.

(e) Transverse myelitis.—Two cases (referred to later) improved considerably.

GROUP II.

No attempt will be made to evaluate therapeutic results in this group of eight cases receiving an average of 20 injections of aldarsone followed by tryparsamide therapy (2 gm.). All patients in this group tolerated the drug well with the exception of one woman suffering

^{*}Fever therapy sponsored by the Ontario Department of Health-V.D. Division.

[†] Two serious complications involving the optic nerve by the use of another pentavalent arsenical at the height of the fever, as revealed by Bromley5 tended to discourage the method. Subsequent reports of Bennett, Morrison and Modlin⁴ describing neuro-ophthalmologic complications coincident with aldarsone administered at the height of fever, vindicated this initial caution.

from cerebro-vascular neuro-syphilis, who developed a typical nitritoid reaction after the third injection of the second course. A further injection the next week produced the same result. One patient in this group combining neuro-syphilis with aortic aneurysm survived six years after the diagnosis of aneurysm was made.

GROUP III.

Two interesting cases in this group combining early paresis with essential hypertension, received 40 and 60 injections of aldarsone (1 gm.), respectively, and had complete reversal of spinal fluid serology and marked permanent reduction of blood pressure followed over a period of $2\frac{1}{2}$ years. One case, described in detail below, with paresis combined with aortic aneurysm made an excellent response. Six cases of asymptomatic neuro-syphilis receiving an average of 30 injections had negative spinal fluids as followed over a period of one to four years. One case of taboparesis showed little response after 30 injections.

From the above groups, five cases of especial interest have been selected for detailed discussion.

CASE 1

Miss A.B., aged 34, was admitted to Victoria Hospital on February 9, 1941, suffering from gastric crisis with nausea and vomiting and inability to retain any food on the stomach for the two weeks prior to admission. This condition was first noted on August 1, 1940, and became progressively worse until admission. In addition, there was bladder disturbance with retention of urine of from 18 to 24 hours at a time. patient was also very emotionally unstable, complained of severe headaches, was very irritable and depressed. On admission, her weight was 88 lb. She was taking 8 or 9 injections of morphine ranging from 1/3 to 1/2 grains daily as well as hyoscine 4 or 5 injections daily (grains 1/200 to 1/100). She complained of alternating constipation and diarrhea. Previous to hospitalization she had been given two small blood transfusions (250 c.c.) and 11 intravenous injections of 2,000 c.c. of 10% glucose. Her spinal fluid, February 12, 1941, was as follows: cell count 24 per cm.; colloidal gold 100000; Wassermann test 431000; globulin, slight increase. She received 69½ hours of fever at 105° with 8 injections of aldarsone in the mid-week intervals. On discharge from the hospital, April 3, 1941, she weighed 105 lb., was mentally and physically improved with complete control of the bladder and cessation of pains from gastric crisis with the morphine habit reduced to a sustaining dose of 1/6 of a grain of pantopon per 24 hours. A continuation of aldersone therapy per 24 hours. A continuation of aldarsone therapy was advised. Subsequent reports four years later in-dicate that she has conquered the morphine habit and is married. Unfortunately a spinal fluid follow-up was non-obtainable.

CASE 2

Mr. H.W., aged 40, became ill on October 25, 1938, with gradual onset of paralysis starting in the left extremity and involving both lower extremities. Later there was loss of bladder function and constipation. The patient was admitted to Victoria Hospital on September 13, 1939, with diagnosis of anterior polio-

myelitis. A spinal fluid taken on November 12, 1939, was as follows: Wassermann, positive; globulin, moderate increase; colloidal gold 1122100000; cell count 64 per cm. He was discharged to his home for treatment but was readmitted to another hospital on April 17, 1939, with increasing symptoms of paralysis and wasting of limbs. In view of the lack of response to antiluetic chemotherapy, he was transferred to the V.D. Division, Victoria Hospital on September 13, 1939. At this time a neurological examination revealed, "patchy involvement of spinal cord in lumbar and upper sacral regions. The damage involves mostly anterior horn cells but there is also patchy loss of pain and temperature sensation with disturbance of the organic reflexes (bladder and rectum). There is also hyperflexia and tremor of the head and arms: cranial nerves normal. Impression.—Luetic meningomyelitis of lumbo-sacral cord with some evidence of involvement of motor cerebral cortex."

This case was considered hopeless by the members of the staff due to the one year's duration of the paralysis. However, it was decided to combine fever therapy and aldarsone intravenously. His first fever therapy treatment was begun on April 9, 1940, and consisted of a total of 50% hours at 105° with aldarsone (1 gm.) in the mid-week interval. His last treatment was given on July 9, 1940. Physiotherapy was combined in an effort to re-educate certain muscle groups. Walking calipers were made and he was discharged from the hospital on August 15, 1940. The patient was able to walk although there was considerable muscle atrophy. Complete control of bladder and rectal functions had been regained. He returned for treatment in the out-patient department. A spinal fluid was taken June 9, 1944; cell count, 0 per c.mm.; Wassermann 44400; total protein 50 mgm. per 100 c.c.; colloidal gold, unchanged; globulin 50 mgm. per 100 c.c.

CASE 3

Mr. R.C., aged 36, was admitted to Victoria Hospital on January 19, 1945. On August 16, 1944, he reported to a doctor with a penile chancre with bilateral inguinal adenopathy. A blood Wassermann proved to be positive. He was given 8 intravenous injections of mapharsen (0.04) and 11 intramuscular injections of bismuth (2 grains). The arsenical injections were temporarily stopped on account of upper respiratory infection. On November 30, 1944, the patient complained of a severe pain in the left leg, paræsthesia and ataxia. There were no variations in the pupils; knee jerks were present but weak and Romberg's sign was positive. He was transferred to a hospital in Windsor, Ontario, where total paralysis occurred with complete loss of bladder and rectal function. Penicillin therapy was administered intrathecally and on further medical advice he was referred for fever therapy. There was some slight improvement following penicillin therapy and in view of this penicillin was continued to a total of 3,200,000 units. Aldarsone therapy was then initiated. At this time, neurological examination revealed, "almost complete paraplegia below D 10 with complete loss of posterior column sensitivity and almost complete paralysis (there being slight movement in the right leg) with diminished to absent deep reflexes and a positive Babinski. Retention of urine, complete loss of pain and temperature over lower abdomen but not much impairment below. Beevor's sign is positive." Spinal fluid examination on January 22, 1945, as follows: cell count 11 per cm.; Wassermann 41000 (moderately positive); total protein 120 mgm, per 100 c.c.; colloidal gold 555542100; globulin, moderate increase.

On February 9, 1945, he was given a trial of fever therapy. This was continued at weekly intervals to a total of 68½ hours at 105.4° with 10 injections of aldarsone given in gram dosage at midweek intervals. Improvement became very rapid and at the completion of fever therapy, bladder and rectal sphincter control had improved remarkably and he was able to walk without the use of a cane or crutches. He was dis-

charged from the hospital on March 29, 1945. Neurological examination as of May 11, 1945, revealed, "paraplegia markedly improved; there is still an area in the spinal cord in the lower dorsal and upper lumbar region in which considerable damage (posterior column, lateral column and anterior horn) is present. The posterior and lateral column supply to left foot is also impaired."

Stokes⁶ quotes the material prepared by Moore as of August, 1944, from the Penicillin Panel of the National Research Council, indicating the reinforcement value of arsenical combined with penicillin. It was felt in the above case that the addition of aldarsone to penicillin therapy in combination with fever therapy would, theoretically at least, offer the best chances of improvement in his condition. This combination with pentavalent arsenicals may ultimately prove the method of choice to be followed in the treatment of symptomatic neurosyphilis. Aldarsone therapy is being continued.

CASE 4

Mr. M.R., aged 48, was admitted to Victoria Hospital on August 6, 1940, for investigation of rapidly deteriorating paresis and aortic aneurysm. He gave a history of possible initial infection in 1917. About five years ago he developed ulcers of the lower legs and three years ago blood Wassermann was found to be positive. He was given 30 injections of bismuth and a similar number of trivalent arsenicals as well as potassium iodide. In spite of the above therapy he progressed to present admission state. Physical examination revealed a typical paretic with outstanding signs and symptoms consisting of a fine tremor of eyelids, lips and fingers, mental deterioration, loss of weight (40 lb.) increased reflexes. His spinal fluid as of August 10, 1940; revealed: Wassermann 4; cell count 38 per c.mm.; total protein 50 mgm. per 100 c.c.; colloidal gold 00122100000; globulin, slight increase. X-ray examination of the chest as of 1940, revealed: "increased density of aortic arch with generalized dilatation and aneurysmal type of enlargement of the base of the ascending aorta." There was little evidence of subjective symptoms of cardiac involvement other than a suggestive ceugh and some sensation of constriction in the chest.

Immediate preceding therapy consisted of potassium iodide by mouth. In spite of the rapid progress of paretic symptoms, fever therapy was decided against in view of the advanced aortic aneurysm. Aldarsone injections were initiated, starting with ¼ gram and gradually increasing to 1 gram dosage at weekly intervals. Response to this form of therapy was rapid and the patient improved mentally, recovered his weight lost and returned to work of a less responsible nature. Since 1940, he has received 140 injections of aldarsone. In the summer of 1944, he experienced a mental lapse and spent three months in the Ontario Hospital. He was discharged and returned for observation to Victoria Hospital in January, 1945. At this time the patient appeared mentally alert and co-operative and seemed likely to carry on at some useful occupation not requiring responsibility. His spinal fluid examination on January 11, 1945, is as follows: cell count 0 per c.mm.; Wassermann 444000 (very strongly positive); total protein 40 mgm. per 100 c.c.; colloidal gold, unchanged; globulin, no increase. No cardiac symptoms were complained of and x-ray examination revealed: "diffuse syphilitic aortitis with aneurysm of ascending aorta partially calcifying, fusiform dilation of aortic arch—no definite radiological signs of cardiac involvement." He is now stock-taking in a successful business enterprise.

In the experience of Moore, Danglade and Reigsinger,⁷ the average duration of an aneurysm due to syphilis after the diagnosis is made is 19 months with little or no treatment. The patient (case 4 above) has survived five years with little symptomatology. He has undergone almost a complete remission of his paretic symptoms though there is some evidence of instability. Aldarsone therapy is being continued.

CASE 5

Mr. A.A., aged 57, was admitted to Victoria Hospital on February 12, 1942, suffering from bed-ridden ataxia. In addition, he had sluggish pupils, hyperactive knee jerks and marked tremor. A blood Wassermann test as of February 14, 1942, proved to be positive, 240 units. A diagnosis of tabo-paresis was made and fever therapy was initiated on February 16, 1942. He received a total of 58¾ hours of fever at 105° in conjunction with mapharsen (0.06) and bismuth along with five injections of aldarsone in gram dosage in the mid-week intervals. This man was discharged April, 1942, and followed up in the out-patient department with 12 weekly injections of aldarsone. After completion of aldarsone, tryparsamide was administered in 2 gm. dosage. A spinal fluid examination November 17, 1942, was: cell count 0 per c.mm.; Wassermann, anticomplimentary; total protein 120 mgm. per 100 c.c.; globulin, slight increase; colloidal gold 555555111. On completion of fever therapy, clinical improvement was marked and this man was able to return to light garden work but not to his former work. Speech which had been non-intelligible and mumbling was corrected considerably and mentally he was much brighter. Spinal fluid test taken at various periods showed a much slower improvement and the final test, on April 19, 1945, showed: cell count 0 per c.mm.; colloidal gold 111222000; Wassermann 44444 (very strongly positive); total protein, insufficient; globulin, slight increase.

The above case was given special mention because of a complicating jaundice developing after the fifth injection of aldarsone and mapharsen during fever therapy. Both drugs were discontinued. However, one month after the completion of fever therapy aldarsone alone was re-administered with no ill effects.

UNTOWARD REACTIONS

No serious reactions were obtained in this series of injections. The patients not only tolerated the drug well but most of them stated that it produced a tonic effect and all put on weight. Four reactions were encountered. (1) A typical nitritoid on the third injection of the second course, in a woman aged 54 years, consisting of choking, flushing, ædema of the face and a sense of impending death. This was controlled by adrenalin. A similar attack recurred on a further trial injection one week later. (2) Exfoliative dermatitis (generalized) occurred in a woman, aged 52, who was an asthmatic with previous skin irritation. This occurred after the eighteenth injection. A complete recovery was obtained but aldarsone was not re-administered. (3) Constriction of the visual fields with blurring of vision occurred in one patient after the third injection. The drug was discontinued and vision was completely restored. (4) Herpes zoster occurred in a patient aged 32, after the seventeenth injection. The eruption spread from the cervical region along the occipitoparietal area to the ear. After its disappearance, aldarsone was started again with no further trouble.

SUMMARY

1. Fifty-four patients suffering from various manifestations of neuro-syphilis were given 2,176 injections of aldarsone.

2. The drug was combined with fever therapy in 36 cases, being given in the mid-week interval. Subsequent results of these are recorded.

3. Two cases of paresis plus aortic aneurysm and two with coincident essential hypertension tolerated and responded well to aldarsone

4. Four reactions consisting of herpes zoster, exfoliative dermatitis, constriction of visual fields with dimness of vision and nitritoid crisis were experienced. The drug was well tolerated in all others, exerting a tonic effect.

5. One case of transverse myelitis was treated with fever, aldarsone and penicillin therapy with spectacular response. One other case of transverse myelitis with complete paralysis of one year's duration responded to fever plus aldarsone therapy.

CONCLUSION

1. Aldarsone is a pentavalent arsenical of relatively high therapeutic efficiency and low toxicity.

2. Aldarsone may be used in conjunction with artificial fever therapy and penicillin therapy to improve the results in symptomatic neurosyphilis.

3. The possibility of untoward reactions should not be excluded in the use of aldarsone.

I wish to thank the members of the Victoria Hospital Medical Staff, under the direction of Drs. George C. Hale and F. J. H. Campbell for their co-operation and especially to Dr. C. A. Cline, Jr., for his neurological interpretations. I would, in addition, like to express my appreciation to the Abbott Laboratories for their generosity in symplying addresses in the carbo their generosity in supplying aldarsone in the early stages of this study.

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RÉSUMÉ

L'aldarsone est un sel arsénical pentavalent dont l'efficacité est relativement élevée et dont la toxicité est faible. Ce produit a été employé seul, avec d'autres agents chimiques et avec l'hyperthermie provoquée. Les malades traités étaient des syphilitiques asymptômatiques, des cas de P.G., de tabès et de myélite transverse. 54 malades furent traités. Deux cas de P.G. compliqués d'anéurysme de l'aorte et deux autres compliqués d'hypertension essentielle ont bien toléré le médicament et ont été améliorés. Un cas de myélite transverse a répondu admirablement à l'aldarsone associé à la pénicilline et à l'hyperthermie provoquée. Les réactions observées furent un herpès zoster, une dermatose, un rétrécissement du champ visuel avec amblyopie et une crise nitritoide. JEAN SAUCIER

POLICY OF TREATMENT SERVICES. DEPARTMENT OF VETERANS' AFFAIRS.

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THERE have been many requests that a description of the presently functioning policies of the Treatment Services in the Department of Veterans' Affairs should be given to the medical profession through the medium of the Canadian Medical Association Journal. While many of these policies were formulated up to a year ago, it was felt that no statement should be made as to what was planned, but rather that a statement should come after the planned policies were actually functioning. We feel that this time has now arrived and that a clear statement of what is going on in the Treatment Division should be made to the medical profession of Canada.

GENERAL POLICY

There are two fundamental principles which have been adopted and which I consider essential for good medical care for veterans in such an organization as the Treatment Services.

The first of these is that there should be very close co-operation with the universities in Can-This results in veterans' hospitals being used as teaching hospitals for either undergraduate or postgraduate teaching. In order that this may take place, it is essential that the most competent university teachers should in some capacity or other direct the medical care in departmental hospitals and supervise the instruction that goes on in them.

The second fundamental principle which is considered essential for a properly functioning medical service of this type is that, as far as possible, doctors having to do with the diagnosis and treatment of patients should be either parttime or temporary employees of the Department. By this means, the part-time employee will also have an outside contact, usually as a teacher in the university or as a consultant in the district. By maintaining either of these contacts he will bring in greater measure to departmental hospitals the latest and soundest methods of diagnosis and treatment. Other temporarily employed doctors having to do with diagnosis and treatment should be, as far as possible, young doctors who are completing their postgraduate training. This will ensure a constant flow of fresh ideas, interest and energy into the hospitals. It is obvious that medical officers engaged in administration, those engaged in treatment in certain hospitals not geographically capable of a close university link-up, and those engaged in certain specialties, must of necessity, be fulltime employees.

METHODS OF EMPLOYMENT OF DOCTORS

Full-time doctors are employed through the Civil Service Commission. These include general duty medical officers, administrative officers and specialists. This group obtains the pension and other benefits of full-time employment.

The second type of employment is for the part-time local consultants. These are temporary appointments and do not have the pension or other benefits of the full-time employee. They are paid on a per diem rate and the amount of their employment depends entirely on the need for their services. For example, at the present time there is considerable plastic surgical work to be done. Specialists in this field are employed to the extent needed to do this work adequately. However, it is anticipated that the amount of plastic surgery to be done will decrease markedly, and when this happens, the amount of employment given these specialists will likewise decrease. These consultants are certified by the Royal College as specialists or

hold the degree of M.R.C.P. or F.R.C.S. Apart from their duties with the Department, they carry on their university appointment and/or their consulting practice.

Another part-time method of employment is for general duty medical officers. These again are purely temporary appointments and do not carry the pension or other benefits of the fulltime employee. During the recent period of expansion in this Department, these officers have been used to do the work which suddenly increased so as to necessitate immediate additional personnel. Like the above, whenever the need for the employment of this class of doctor decreases, so his employment decreases. Another use that is made of this type of employment is for the doctor who is taking postgraduate work part-time in a civilian hospital or university but who desires to give the remainder of his time to service in the Department. These doctors are not specialists, but by this method of employment the part-time services of excellent physicians have been obtained.

Another method of employment is on a feefor-service basis. This is used in the case of specialists whose services are required only to a very limited extent. They are paid for the actual cases seen.

As will be pointed out later, the policy of having departmental hospitals teaching hospitals makes possible the employment of interns. Three grades of interns are employed—junior, senior and resident. Again, these are temporary appointments for one year or less but may be renewed at the completion of a year's service.

Some of these methods of employment would not have been possible and the whole scheme of having teaching hospitals could not have materialized without the co-operation of the Civil Service Commission.

UNIVERSITY - D.V.A. CO-OPERATION

As stated above, it has become the policy of the Department to make D.V.A. hospitals teaching hospitals. In order to accomplish this, there must be the greatest co-operation between the various Canadian universities and the Department. This co-operation has been received to the fullest extent possible.

In order that departmental hospitals may be used as teaching hospitals, it is essential that men on the staff of the universities have a very considerable part in the direction of the medical services within the hospital. This has been accomplished by the appointment of part-time consultants. These doctors retain their teaching appointments in the university, supervise the clinical work in the D.V.A. Hospital and Without these also teach in that hospital. part-time arrangements it would be impossible to employ the high-calibre professional men that we have been able to employ, as they would not be interested in full-time employment. Also, by this plan of part-time temporary employment, the university representatives in the hospital can be changed from time to time. The machinery for the appointment of these part-time local consultants is as follows. The university geographically connected with the D.V.A. hospital is asked to name a panel of part-time consultants in the various specialties whom they consider well qualified to direct the professional work in the hospital. At the same time any specialists in the university centre, though they may not have university connection, are asked to submit applications for appointment if they so desire. These applications, along with the applications received as a result of the university panel, are then considered at Headquarters by a Selection Board of departmental specialists and the best men are chosen to fill these positions.

The university may decide, depending on local circumstances, to use the hospital for either undergraduate and postgraduate teaching. In either case, only medical officers employed by the Department teach in the hospitals. If the hospital is used for undergraduate teaching, the schedule for clinics is worked out by the university in co-operation with the hospital authorities.

Postgraduate teaching taking place in the hospital is probably one of the biggest factors in producing and maintaining a high standard of medical care in that hospital. In universities which provide diploma or certification courses in the specialties, the postgraduate student is employed in the departmental hospital for some of his five years of training. The remainder of his training may be spent in the basic sciences or in civilian teaching hospitals associated with the university. By this method, young, keen doctors are constantly arriving and departing after having spent a year or two years in the hospital. This helps to guarantee that the

standard of medical care in D.V.A. hospitals will be maintained at a high professional level, and as facilities for postgraduate work in Canada are limited for training medical specialists these hospitals should become important centres for postgraduate teaching.

It has been found advantageous, particularly in some specialties such as laboratory services, anæsthesia, radiology, etc., that the Department employ full-time specialists to direct these special services in the hospital. As pointed out above, these specialists must be certified by the Royal College or possess an equivalent or higher qualification. The Department is anxious that these full-time employees obtain university appointments in university centres where this is deemed feasible and where the university considers their qualifications adequate. An additional link between D.V.A. hospitals and the university is the appointment in departments such as radiology, etc., of a part-time consultant from the university.

Interns and residents receive appointments in the same manner as the part-time local consultants. The universities nominate candidates and individual doctors may apply. Again, these applications are considered by a Selection Board of consultants to the Department who select the most suitable candidates. With the demobilization of the Armed Forces, many medical officers who have had little or no postgraduate work due to their participation in World War II are able to obtain this postgraduate work in depart-Civilian teaching hospitals mental hospitals. have been unable to accommodate the number of these medical officers desiring postgraduate work so that the large numbers now employed in departmental teaching hospitals is meeting the rehabilitation problem and at the same time providing excellent, keen medical officers, who under the direction of the part-time consultants or full-time specialists do a great deal of the routine work formerly done by full-time general duty medical officers.

Another example of university co-operation is that in those centres where new hospitals are being constructed, part-time consultants from the university advise regarding the internal physical arrangements of the various departments. This results in the construction of a more efficient hospital.

The university may outline a postgraduate course to a medical officer and this course may include a stay of varying periods in D.V.A.

hospitals. Apart from this, the medical officer himself may wish a postgraduate course which is not directed by the university. If the candidate is considered suitable by the Selection Board, the Department may help in providing postgraduate courses of various lengths leading up to certification as a specialist.

ADVISERS OR CONSULTANTS TO HEADQUARTERS

The establishment set up at Headquarters is purely an administrative one, very similar to the Services establishments. In order that the Headquarters staff may function effectively, they must be advised by highly qualified specialists in different branches of medicine. Specialists working in various hospitals and representing various specialties are chosen to act in this capacity. In addition to serving as consultants to Headquarters they supervise the work in their respective specialties in all departmental hospitals across Canada. They are provided with adequate assistance in the hospital in which they work so that they may make indicated trips across the country to see that the same standards of diagnosis and treatment are maintained in all hospitals and generally co-ordinate the work of the various hospitals.

ZONING

Since it has been the accepted policy of the Department that their hospitals shall be teaching hospitals and as such, closely associated with universities, it is obvious that this policy functions much better if the hospital and the university are geographically closely associated. In the university centre would be located the main teaching hospital for the district, other hospitals in the district being known as "zoned hospitals". They will be controlled as far as their professional activities are concerned, by the main teaching hospital. The directors of the various branches of medicine in the main teaching hospital will decide what types of cases will be treated in the zoned hospitals. The veteran will be treated, either in the zoned hospital or main teaching hospital, depending upon where the facilities are most adequate. Even though treatment facilities are adequate in the zoned hospitals, if some special investigation or therapy for certain conditions is being undertaken in the main teaching hospital, patients suffering from these certain conditions may be sent there at the discretion of the Director of the service concerned in the main teaching hospital. Highly specialized forms of therapy will as a

rule, be undertaken only at the main teaching hospital, *i.e.*, such specialties as Plastic Surgery, Neuro-Surgery, etc., will not be undertaken in the zoned hospital and patients requiring such forms of therapy will be transferred to the main teaching hospital.

These zoned hospitals will be staffed by parttime local consultants in the cities where they are situated. These consultants will be responsible for the treatment given in the hospital under the over-all supervision of the Director of the Service in the main teaching hospital.

The zoned hospital shall be staffed by interns and residents who will spend a portion of their internship or residency in the zoned hospital but most of their internship or residency in the main teaching hospital. In other words, interns and residents will be rotated between main teaching hospitals and zoned hospitals.

It is proposed that other professional staff such as nurses, dietitians, physiotherapists, radiographers, occupational therapists, laboratory technicians, etc., in the smaller zoned hospitals shall also rotate at various intervals and spend some time at the central teaching hospital.

It is felt that by this arrangement the best medical care can be provided, and that also the central teaching hospital will be furnished with adequate numbers of cases of certain diseases, for investigation and special therapy. The central teaching hospital will by this method also be provided with the best teaching material.

HOSPITALS NOT GEOGRAPHICALLY CAPABLE OF ZONING

In those hospitals some considerable distance from universities it is generally advisable to put full-time certified specialists in charge of departments. However, as in other hospitals, the employment of interns and residents is encouraged. Part-time local consultants are also employed. These are chosen by asking the local medical association to nominate a panel of suitable specialists or consultants. As well as candidates from this panel, any specialist in the city may apply. Again, these applications are considered by the Selection Board at Headquarters and the most suitable candidates selected. The advisers or consultants to Headquarters visit these hospitals from time to time, the same as the teaching or zoned hospitals.

DOCTORS-OF-CHOICE PLAN

Formerly, in districts where no departmental hospital existed, the veteran was treated for a condition which did not require his transfer to a departmental hospital by a doctor known as the departmental representative. The veteran had no choice of physician. This policy has been changed and at the present time the doctor-of-choice plan is in operation. Under circumstances as outlined above, the veteran may have free choice of doctor in his community. The type and extent of medical care which may be given locally by the doctor of choice is outlined in instructions presently available in all district headquarters.

MODERN CONCEPTIONS OF THE PATHOGENESIS AND MORBID ANATOMY OF MALARIA*

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IN spite of the long history of malaria as a disease it seems that the mechanism of its impact on the tissues and their reaction to the insult has taken longer to be revealed to us than have the processes of other diseases of equal antiquity. Modern work, however, has done much to correct this ignorance and the outlines of the picture, painted by many hands, is gradually becoming clearer.

IMMUNITY

The question of the development of a significant immunity to the disease has always been controversial. All workers have recognized that some immunity usually develops under the stimulus of infection, but in the case of malaria it has been the habit to treat this as being of too low a grade to seriously influence the course of the disease in the individual or to modify its spread in the community. Until recent years too little was known of its nature. Our present experimental knowledge dates from the introduction of the malarial therapy of paresis by Wagner-Jauregg, which opened the way to controlled human studies. Clark, and Strickland

and his associates have shown that infants up to three or four months old enjoy almost complete immunity from the disease even when heavily exposed. Whether this is derived from a healthy or an infected mother is not clear. This passive immunity rapidly disappears, to be succeeded by an acquired immunity due to heavy infection. This has been measured by various observers by gametocyte counts, as it has been shown that gametocyte production proceeds in inverse ratio to the growth of immunity. B. Wilson² in Tanganyika, in an area in which practically all infants are infected before the age of 5 months, has shown that while gametocytes in the blood reach their height at the age of 24 months they are seldom seen in adults. In certain districts of Kenya and also in Panama a similar decrease in gametocyte count has been shown to be the rule as adult age is reached.

The influence of race on infection appears to be real; for example the tolerance of the negro race to infection cannot be disputed. Negroes have been shown to possess a marked tolerance to infection with P. vivax and to react in a milder fashion to infections with P. malariz and P. falciparum than members of the white race. This racial difference is reflected in the types of parasites found, white children showing greater numbers of vivax parasites and negroes greater numbers of falciparum. The seasonal incidence of the disease in areas inhabited by the two races reflects accurately the difference of the predominating type of parasite in each case. That this tolerance is racial rather than acquired is shown in human experimental work, in which tolerance to P. vivax inoculation is exhibited equally by negro children as well as adults. A difference in the reaction of West Indian negroes and East Indians has also been reported by Giglioli³ of British Guiana. He finds that while the parasite rates are closely comparable, the reaction to the infection as measured by the spleen rate is completely different; the latter index being much lower in negroes than in East Indians (13 to 70).

Turning to the question of the mode of development of immunity we find that a single infection confers very little except after a comparatively long period of recrudescence and relapse. Ciuca, Ballif and Chelarescu-Vieru⁴ in a study with *P. vivax* found that it required four infections before a solid and completely successful immunity was established. With *P.*

^{*}Read at the eighth annual meeting of the Ontario Association of Pathologists, Toronto, October 20, 1945. From the Department of Pathology, University of Toronto and the Hospital for Sick Children.

malariæ it required no less than six infections. Nevertheless all workers are unanimous that complete immunity to an individual strain of parasites can be established. The duration of this immunity has been the subject of much speculation and some study. It seems to have been pretty well established that lasting immunity is dependent upon either latency of infection or repetition of the infection; so that even if a solid immunity does become established it will rapidly weaken unless the infection remains latent or unless frequent periods of reinfection (with probable latency) occur. Gill⁵ in India has brought forward evidence of an epidemiological nature to support this.

Thus it would seem necessary that parasites be actually in the body, either permanently or at frequently recurring intervals, to maintain immunity. Nevertheless, cases have been reported of apparent long standing immunity to infection; thus Boyd, Stratman-Thomas and Kitchen⁶ have reported a case in which effective immunity was present three and a half years after infection and recovery, and James and Ciuca⁷ report an apparent immunity five years after recovery from an infection. Among factors influencing the development of immunity must be mentioned the important effect of treatment. From what has been said it might be surmised that treatment would prevent the establishment of perfect immunity, and this proves to be the case. Since the effect of treatment is to destroy parasites, and the stimulus to the production of immune bodies is the presence of parasites in the organism, it follows that early and effective treatment is a complete bar to the development of immunity.

All observers agree that the immunity is of a highly specific nature. Not only is it specific for the species involved but for the particular strain within the species. Thus Boyd, Stratman-Thomas and Kitchen⁸ report that while it is possible to develop a good homologous immunity to P. falciparum, heterologous immunity is poor. Similar results are seen with the other species of plasmodia. Nevertheless, that some immunity is produced to heterologous strains is shown by the fact that such infections commonly show fewer febrile episodes and may come to a spontaneous end. From an epidemiological viewpoint this high specificity greatly lessens the value of the immunity because of the great number of strains existent at any one time. It requires a matter of years before any one individual can expect a solid immunity to most of the strains of the species infecting any particular community.

What is the nature of this immunity? It has been shown to be both humoral and cellular, the latter being of infinitely greater importance than the former. Both complement fixing antibodies and agglutinins have been demonstrated in the serum of infected persons. These antibodies have been shown to be capable of passive transmission and to exert protective and therapeutic effect on those to whom they have been admin-Soteriades,9 and Lorando and Soteriades¹⁰ have reported beneficial therapeutic effects in infected patients, of both serum and whole blood from patients who were judged to have a high degree of immunity owing to recovery from attacks of malaria with latent parasites in the blood. Protection tests on animals carried out by Coggeshall and Kumm, 11 using the serum of rhesus monkeys with chronic P. knowlesi malaria prevented death from this very virulent infection. Coggeshall and Eaton¹² have also shown that a quantitative relationship exists between the number of parasites used in inoculation and the amount of immune serum required for protection. Coggeshall¹⁸ found that serum from paretics with induced P. knowlesi malaria exerted protection in the case of monkeys infected by the same parasite. Serum from the same patients before infection was ineffective.

Let us turn now to the cellular basis of immunity against malaria. The importance of the cellular immunological reaction lies not only in the importance of the rôle implied by its description, but because its response runs throughout the whole pathologic physiology of malaria like the recurrent theme in a Bach fugue. It probably offers the best picture in human pathology of the hyper-functioning of the reticulo-endothelial system.

The cells most active in the immunity of malaria are those cells of the connective tissue type, derived from the embryological mesenchyme and having a wide and various distribution. Included in this group are cells of the lymph and blood stream and the reticular and loose connective tissue cells. These cells, as Taliaferro¹⁴ points out, "owe their functional importance to their wide distribution over the body, their capacity for phagocytosis, their ability to secrete enzymes and antibodies and their . . . potencies to develop into other blood and connective tissue cells". The most

important of the predominantly fixed connective tissue cells in the defense reaction are the socalled macrophages. The word macrophage includes the following: (a) reticular cells proper, especially (in malaria) those of the spleen and bone marrow; (b) such sinusoidal cells as are exemplified by the Küpffer cells of the liver; (c) certain fixed, undifferentiated cells in proximity to small blood vessels throughout the body (Maximow); and (d) the macrophages proper; the latter including those cells commonly known as histiocytes and clasmatocytes, as well as the resting wandering cells of Maximow, the last group making up a considerable proportion of the connective tissue throughout the body. In addition to this group of cells it may be mentioned that true fibroblasts and true endothelial cells play a reparative rôle in areas where tissue destruction occurs. The macrophage group described is practically identical with Aschoff's reticulo-endothelial system.

Taliaferro14 describes "four main aspects of the functional rôle of cells in malarial immunity: (1) the phagocytosis by various leucocytes and, in particular, by macrophages of parasites and other materials incident upon the infection; (2) the production of new phagocytes; (3) various reparative proliferations other than the production of phagocytes; and (4) the elaboration of specific antiparasitic antibodies." three can be and have been studied extensively in histological preparations. The fourth, however, has only been investigated by indirect methods with results that are suggestive but by no means conclusive. A reflection of this cellular activity is seen in the presence in the peripheral blood of a varying but usually increased number of cells of the monocytic series. It will be recalled that the process of schizogony results in the liberation of the pigment hæmatin in quantity into the circulation. This pigment is removed in particulate form by phagocytes of the reticulo-endothelial system, which may often be seen fairly stuffed with pigment.

Additionally, these cells phagocytose blood cells containing living parasites, thus fulfilling their immunological rôle. The phagocytic function of these cells proceeds in no casual manner but according to an orderly and well defined pattern, which resembles a definite immunological response. This is beautifully proved by the experiments of Cannon and Taliaferro¹⁵ and Taliaferro and Cannon¹⁶ on animals, which showed that there is a much more avid consump-

tion of parasitized corpuscles by the macrophages as the infection proceeds than is the case initially, this undoubtedly representing the beginning of the immune response. At this period the infection is held in check at a low level of activity. A subsequent infection with the same parasite shows a tremendously accelerated rate of reaction by the macrophages in the initial stages, showing that an immunity has been acquired as a result of the first infection. This phagocytic activity of the cells of the R. E. system may fairly be said to dominate the picture of the morbid anatomy of malaria and to determine its pattern.

The organic lesions seen post mortem in man are practically all the result of infection with the sub-tertian parasite, but, nevertheless, they offer a good example of the results of the greatest activity of the parasites causing the maximum degree of organic disturbance. Perhaps the most striking appearance met with at post mortem in cases dying from pernicious malaria is the general pigmentation of the organs, best seen in the brain and abdomen,—a slaty-blue coloration This, of course, is which is unmistakable. caused by the enormous amount of pigment liberated by the maturation and rupture of the merozoites, phagocyted by the cells of the R. E. system and related mononucleated cells. A noteworthy feature of pernicious malaria is the widespread occurrence of vascular injury, illustrated by generalized fatty degeneration of the endothelium. Resulting at least in part from this are seen necrotizing lesions, such as the so-called ring hæmorrhages of the brain, perivascular necrotic areas (malarial granulomas), degenerative changes in the cells of the nervous tissues, and hæmorrhagic necrotizing lesions seen in the myocardium, suprarenals, etc.

All such lesions stand, too, in close etiological relationship to a phenomenon of the utmost importance—the slowing of the capillary circulation in certain specific areas, notably the brain. This slowing naturally results in diminished oxidation of the tissues concerned, with resulting mal-function or even death of the cells. What is the cause of this slowing? This whole question has exercised students of malaria the world over for many years. It has been variously attributed to damaged endothelium, to altered viscosity of the blood cells or to some property of the parasites themselves. It was at one time thought that phagocytosis of parasites by the endothelial cells of the capillaries

was a common phenomenon and was responsible for the diminished blood flow through them. Phagocytic activity of the endothelial cells is now regarded as the exception and not the rule and this cannot be the cause. Nor is it due to anything of a strictly local nature as it is seen not only in the brain but also in the myocardium, gastro-intestinal tract, etc. The reason seems to be some altered physical quality of the parasitized red cells. These have been shown experimentally to have acquired a "sticky" quality which causes them to partly adhere to the vessel walls. The same character probably explains the observation of Cropper¹⁷ and Dudgeon and Clark¹⁸ of the agglutination of parasitized corpuscles seen in thrombi in the brain, kidneys and suprarenals of fatal cases.

This quality, too, helps to explain another occurrence regularly observed in subtertian infection, that is, the concentration of the more mature forms of the parasite in the capillary circulation of the organs and their relative absence from venous blood. Bass has experimentally shown that the parasite of subtertian malaria is of a distinctly less malleable nature than either of the other two common species and that corpuscles parasitized by it pass through the smallest capillaries with distinctly more difficulty than do those parasitized by other species of plasmodia. It is instructive and useful to bear in mind this capillary blockage, relative or absolute, as it probably bears a closer etiological relationship to the symptoms of subtertian malaria than any other single pathological lesion. Consider, for example, the severe headache, drowsiness, or even coma, forming the outstanding symptoms of the so-called cerebral malaria; or again the choleraic or dysenteric symptoms of the algid type. All these symptoms may be explained readily on such a basis. Dudgeon and Clarke¹⁸ have pointed out, too, the important effect of capillary obstruction in the production of the lesions seen in the myocardium and the importance of the resultant anoxemia in producing circulatory symptoms.

LIBERATION OF PIGMENT BY PARASITES

Another event in the life history of the malarial parasite which has an important bearing on the pathological lesions is the maturation of the parasites, resulting in the liberation of large quantities of pigment into the circulation. Much of this pigment is immediately picked up by the cells of the R. E. system and it has

been suggested that an actual "blocking" effect may be produced on this system such as is seen after the injection of carbon particles into the circulation. It is unlikely that much of the pigment remains long in a free state in the circulation; it is all ultimately phagocyted. I have on occasions seen small blocks of it being carried by ordinary polymorphonuclear cells. It is not unlikely that the liberation of pigment might be a factor in the production of the well known paroxysm of rigors and elevation of temperature so characteristic of the disease. On the occasion of the rupture of the parasitized corpuscle unchanged hæmoglobin, in addition to pigment, is liberated into the circulation. This imposes a further load on the R. E. system, whose function it is to convert it into bilirubin, which passes to the liver to be secreted into the bile. This accounts for the thickened bile and the dysfunction of the liver so common in malaria. The liver is usually enlarged, congested and contains much bile. Damage to the parenchyma is of no characteristic type, but the cells contain hæmosiderin and malarial pigment, often in quantity, and fatty infiltration is common.

The brain in fatal cases shows striking lesions. There is often an overall pigmentation, with gross congestion. Histologically the smaller blood vessels are engorged and many of them show thrombi composed of agglutinated, hæmolized red cells and blood pigment. The capillaries, in suitably stained preparations, are stuffed with parasitized corpuscles. This may be best demonstrated by "squashing" a small particle of brain substance on a slide, drawing it out like a blood smear and staining with Giemsa. The capillaries may thus be seen outlined by the parasitized cells contained within them. Much pigment is present. Sometimes perivascular "ring" hæmorrhages are seen with accompanying necrosis, and many nerve cells show degenerative changes. There is a remarkable absence of perivascular exudative reaction.

The spleen, along with the liver and bone marrow, plays a vital rôle in malarial infection and consequently suffers accordingly. Enlarging during each paroxysm, the organ tends to resume its normal size after this has passed, but as the disease proceeds it gradually enlarges, and the chronic sufferer always shows some degree of splenic enlargement. Its phagocytic rôle determines the slaty blue pigmentation which is commonly seen. Infarcts may be pres-

ent. Microscopically there are hæmorrhages and focal necroses, but probably the most striking thing of all is the immense accumulation of debris contained in the dilated sinuses, consisting largely of pigment masses, broken down cells and parasites, some phagocyted and some lying free. There is great proliferation of the endothelioid cells and a corresponding "depletion" of the lymphoid tissue of the nodules. It is held strongly by Taliaferro14 that this loss of lymphoid cells is due to the function assumed by these cells in acting as a reserve supply for the macrophages of the body under the stimulus of the malarial infection. This malarial splenomegaly, which is so common in tropical countries, becomes of importance to the medico-legal pathologist because of the increased liability to rupture of the viscus even after comparatively slight trauma.

Kidney function is as a rule little disturbed in malaria, amounting to the passage of small amounts of albumin during febrile periods and that is all. Goldie¹⁹ has however described cases corresponding closely to a lipoid nephrosis showing ædema, with much albumin, and hyaline and granular easts in the urine. This occurs in the course of infection with any of the three parasites, but appears much commoner with quartan than either tertian or subtertian infection. The condition usually disappears with antimalarial treatment but fatal cases have been reported.

CHANGES IN THE BLOOD

The blood in malaria naturally reflects the marked changes in metabolism incident on widespread blood destruction and also shows evidence of the hyperactivity of the R. E. system. There is a leukopenia with a relative increase of the monocytic elements, and in pernicious malaria many of these cells may be seen to contain irregularly shaped particles of malarial pigment. Where these are recognized in the blood the search for parasites if not already successful must be pursued to finality. The increase in mononucleated elements is assumed to reflect the activity of the R. E. system rather than an increase in the activity of the bone marrow. The reticulocyte count is increased. In this connection it has been shown that the different parasites display well defined differences in behaviour toward reticulocytes. P. vivax for example shows a much greater preference for reticulocytes than for mature cells, while P. falciparum appears indifferent in this respect

and P. malariæ seems to prefer mature erythrocytes to reticulocytes. The hæmoglobin content of the blood is of course reduced—especially in chronic and long standing infections.

BLACK WATER FEVER

This syndrome is of extreme interest in the pathology of malaria. Its ultimate cause is still a matter of dispute and about the only statement which may be made without inviting controversy is that it is intimately related to malarial infection. The outstanding feature of the pathogenesis is the occurrence of intravascular hæmolysis. The presence of lytic substances in the blood serum would naturally be expected, but these have not been demonstrated. hæmoglobinuria which gives its name to the clinical syndrome usually appears within an hour or so after the rigor, which is present in about 70% of cases. The duration of this is variable but it is commonly less than 24 hours. urine is loaded with oxyhæmoglobin, methæmoglobin, urobilin and albumin. Bile pigment and bile salts are uncommon in the urine of black water fever.

The question of the origin of the hæmolysis is naturally one which has exercised the minds of investigators for many years and still remains to be settled. Yorke, Murgatroyd and Owen²⁰ suggest that the hæmolysis occurs in the sinuses of the spleen and liver, but this lacks proof. The rate of blood destruction is variable but is often great—as much as 1 million in 24 hours. Anuria may occur and the non-protein nitrogen reach a high level. Icterus is seldom absent, the greatest degree being seen in those cases with anuria. Ross²¹ makes an interesting observation, pointing out that gall stones occur more frequently in those who have had black water fever or severe malaria than in those who have not. The liver shows only the ordinary stigmata of malaria already described. The liberated hæmoglobin is found in the plasma in large quantities. Part of it passes over the kidney threshold and is found in the urine. Some appears to be changed into methemalbumin and circulates as such but the bulk of it is quickly changed into bilirubin by the R. E. system. The van den Bergh test is positive in its indirect form. If the liberated iron is not immediately used in the reformation of new hæmoglobin it may be stored as hæmosiderin in the parenchymal cells of the organs, especially the liver and kidneys. The kidneys are enlarged as a rule and the epithelium of the convoluted tubules shows degenerative change and the lumina contain casts of erythrocytic debris and epithelial cells.

SUMMARY

A review of our present conception of the reaction of the tissues to infection with malaria has been presented together with a short note on blackwater fever.

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RÉSUMÉ

Toute la question de l'immunité de la malaria est passée en revue, notamment, à propos de ses aspects humoraux et du rôle joué par le système réticuloendothélial. L'immunité paraît être hautement spécifique. Les cellules les plus actives dans le processus d'immunisation sont celles du tissu conjonctif, plus particulièrement, les cellules lymphatiques et les cel-lules du sang. Ce qui frappe le plus l'observateur à l'autopsie des sujets morts de malaria est peut-être la pigmentation bleue-ardoise généralisée des organes. Les vaisseaux sont le siège d'une dégénérescence grais-Les vaisseaux sont le siège d'une degenerescence grais-seuse importante de l'endothélium; on rencontre des dégénérescences cellulaires, des hémorrhagies et des zônes de nécrose. La libération du pigment par les parasites expliquerait l'hyperthermie. Les modifica-tions observées au niveau du sang démontrent l'extra-ordinaire activité du systême réticulo-endothélial. Un syndrôme connexe, la "Black water fever" est dû l'hémolyse intravasculaire avec hémoglobinurie, urobilinurie et albuminurie. JEAN SAUCIER

Many a man lives a burden to the earth; but a good book is the precious blood of a master spirit, embalmed and treasured up on purpose to a life beyond life.-John Milton, Areopagitica.

A STATISTICAL ANALYSIS OF 1,214 CASES OF CARCINOMA

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THE purpose of this review of the carcinomas which were found at autopsies in the Vancouver General Hospital was to determine the incidence of the various growths in the different organs; their relation to the age and sex of the patient; the site of metastases; and any correlation of this material with the patient before his death. All the post mortems which were performed during the ten-year interval from 1934 to 1943 were reviewed. In Chart 1 there is outlined in statistical summary the various points which were the basis of this investigation. Of the total of 7,186 autopsies which were performed, 1,214 were recorded as revealing definite evidence of malignancy of some type and of this figure 870 were males and 344 females. Also, 5.9% of all hospital admissions died while in hospital and 18% of these had an ante-mortem diagnosis of carcinoma. It was impossible to analyze this figure of 18% because autopsies were not performed on all patients who died in the hospital. However, since 16.9% of the autopsies revealed malignancy, it may be assumed that the ante-mortem diagnosis was the correct one.

In Chart 2, there is a tabulation of the incidence of carcinomast according to the primary site. There were 30 primary sites in all. The chart is so arranged that the number that occurred in each site each year can be seen. In the vertical line in the chart below the word "year", there are figures which represent the relative frequency of the primary malignancy according to each site, thus, skin is 17th in frequency, mouth is the 22nd, etc. The remainder of the chart is self-explanatory. Gastric carcinoma was the most frequent, with bronchogenic carcinoma next in frequency. The third most common site was carcinoma of the rectosigmoid region. These three primary sites together comprise slightly more than one-third of all the sites (34.7%). A second point of interest

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[†] Defined as a malignant new growth of epithelial or gland cells infiltrating the surrounding tissue.

is that the gastro-intestinal tract, including the tongue and glandular appendages such as liver, pancreas and gall-bladder, provides 46.3% of all primary sites of carcinoma and therefore outweighs any of the other systems in a discussion

of the site of origin. Unexpected finding was the relative frequency of carcinoma of the pancreas, namely, fifth in the series. Over the tenyear period, there has not been any significant increase or decrease in the relative frequency

CHART 1

Year	Ad-	Deaths includ- ing pa- tients and still-	Stillbirths	Pa-	of patient deaths	a	Total utopsie	28	cases				tops		pati	topsies ents dy hospit	jing			oup
Year	mis- sions	births	Stil	tients	No.		М.	F.		М.	F.		M.	F.		<i>M</i> .	F.		M.	F.
1934	15,388	902	53	849	154	524	390	134	44	37	7	25	15	10		338	117	82	64	18
1935	15,629	987	39	948	192	527	381	146	38	31	7	10	5	6	479	346	133	93	69	24
1936	17,566	1,089	34	1,055	188	512	344	168	44	25	19	6	5	1	462	314	148	74	51	23
1937	18,705	1,156	48	1,108	210	638	466	172	37	29	8	12	8	10	589	429	160	127	91	36
1938 1939	19,266 19,702	1,170 1,128	42 55	1,128 1,073	200 207	734 774	501 573	233 201	65 75	54 67	11 8	19 32	19	12 13		440 487	210 180	134 145	94 113	40 32
1939	20,550	1,126	54		244	907	630	277	110	90	20	24				528	245	157	103	54
1941	21,136	1,277	62	1,215	241	723	537	186	102	86	16	19		10		442	160	110	81	29
1942	22,429	1,232	77	1,155	203	916	640	276	143	117	26	40	20	20		503	230	132	95	37
1943	23,085	1,356	74		247	931	667	264	120	88	32	44		15		550	217	160	109	51
	193,406	11,566	538	11,028	2,086	7,186	5,129	2,057	778	624	154	231	128	103	6,177	4,377	1,800	1,214	870	344

M. = Male. F. = Female.

CHART 2.
PRIMARY SITE OF CARCINOMA

	Year	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	Total for each primary site in 10-year period	Percentage for each primary site
Skin	17	1	3	1	2	5	4	4	1	2	5	28	2.14
Mouth, etc	22			2	2		1	2	2	3		12	0.93
Tongue	18	1	4		7	2	3	3	2		2	24	1.98
Larynx	19	2	1	1		2	1	5	3	3	4	22	1.89
Pharynx	16	2	1	3	2	5	6		2	5	4	30	2.47
Thyroid	24		2	1	1	ĭ		1			2	8	0.65
Bronchogenic	3	7	7	4	13	18	19	14	12	11	15	120	9.87
Lung	21	3			3	1	1 *		2	î	2	15	1.23
Œsophagus	7	7	4	2	5	6	5	6	4	9	8	56	4.61
Stomach	í	14	22	12	25	13	18	22	17	16	28	187	15.4
Small bowel	26			1		1	10	44	14	1	-	3	0.26
					7	3	· .	6			11	50	4.11
Large bowel	8	6	4	4			4		4	3			
Recto-sigmoid	2	8	5	10	5	16	19	16	6	19	12	116	9.55
Pancreas	5	3	8	4	9	8	7	2	6	5	8	60	4.93
Liver	14	6	2	2	2	3	1	6	5	3	6	36	2.79
Extra hepatic	15	4	2	1	2	3	4	6	4	3	5	34	2.80
Adrenals	20		2	1	3	1	1	2	2	2	2	16	1.30
Kidneys	13	3	4	2	5	1	5	9	4	4	1	39	3.21
Bladder	11	3	4	2	1	5	8	9	7	4	3	46	3.79
Prostate	4	3	4	2	11	14	14	13	6	6	18	91	1.57
Testicles	25	1	1			1	1	1	1		1	7	0.57
Memb. urethra	29						1					1	0.08
Breast	6	2	1	9	4	10	7	11	5	5	4	58	4.77
Ovary	12	3	1	2	7	5	3	4	4	7	6	42	3.46
Uterus	23			1		1		1		3	3	9	0.72
Cervix	10	3	5	2	2	5	10	7	4	5	4	47	3.87
Vagina	29										1	1	0.08
Brain	9	4	5	4	6	5	i	3	9	6	7	50	4.11
Pituitary	27		1				î			ĭ	i	4	0.32
Bone	28			i			î					2	0.16
Total of all pri- mary carcino- mas each year. (Autopsy ma-	20			1								2	0.10
terial)		86	93	74	124	135	149	155	111	127	163	1,214	
ocitai)		00	90	12	141	100	123	100	17.	121	100	1,217	

CHART 3 ST	273700

	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	Total
Squamous	1	3		2	4	4	3		2	3	22
Melanotic ca			1					1		2	4
Basal cell ca					1		1 .				2
Sex-Male	1	1	1	2	3	3	2		1	3	17
Female		2			2	1	2	1	1	2	11

CHART 4. MOUTH-12.

	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	Total
Squamous			2	2		1	2	2	3		12
Sex—Male			2	2		1	2	2	1		10
Female									2		2

CHART 5. TONGUE-24.

	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	Total
Squamous	1	4		7	2	3	3	2		2	24
SquamousSex—Male	1	3		7	2	3	2	2		2	22
Female		1					1				2

CHART 6. LARYNX-22.

	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	Total
Squamous					2	1	4	3	3	4	21
AnaplasticSex—Male			.:				1				1
Female							1			4	1

CHART 7. PHARYNX-30.

	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	Total
Squamous	1		3	1	4	5		1.	2	2	19
Anaplastic		1							3	1	5
Adeno						1		1		1	3
Round ceil ca					1						1
Transitional cell ca				1							1
Papillary											1
Sex-Male		1	3	2	3	6		1	5	4	27
Female					2			1			

CHART 8. THYROID—8.

	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	Total
Papillary			1				1			1	3
Adeno		2								1	3
Diffuse					1						1
Anaplastic											2
Sex—Male											2
Female		2			1		1			2	6

CHART 9. BRONCHOGENIC-120.

	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	Total
Anaplastic	4	5	3	7	11	9	5	5	10	10	69
Squamous	2	2	1	6	6	8	5	5	1	3	39
Adeno	1				1	2	1	2		1	8
Mixed							2				2
Papillary										1	1
Atypical							1				1
Sex-Male	5	6	3	12	16	17	14	10	10	13	106
Female	2	1	1	1	2	2		2	1	2	14

CHART 10. LUNG-15.

	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	Total
Adeno	1			1			1			1	4
Squamous				1				2	1		4
Anaplastic	1				1	1					3
Miliary carcinosis							1				. 1
Mixed	1										1
Endothelioma				1							1
Teratoma										1	1
Sex—Male	1			3	1	1	1	2	1	2	12
Female	2						1				3

CHART 11. ŒSOPHAGUS-56.

	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	Total
Squamous	7	3	2	4	5	4	6	1	7	6	45
Adeno		1			1	1		1	1	1	6
Anaplastic								1		1	2
Papillary				1				1			2
Medullary									1		1
Sex—Male	7	2	2	2	6	5	4	3	9	6	46
Female		2		3			2	1		2	10

Снавт 12. STOMACH—187.

	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	Total
Adeno	8	10	6	13	10	13	14	7	8	19	108
Simplex	6	7	3	2	1	1	4			1	25
Scirrhous		4	3	2	1		2	5	3	1	21
Colloid		1		4			2	3	1	2	13
Anaplastic				2		3			2		7
Linitis plastica				2		1	2			1	6
Medullary				1					2	1	4
Papillary								1		1	2
Unknown								1			1
Sex-Male	12	19	10	19	11	14	15	14	13	18	145
Female	2	3	2	7	1	4	9	3	3	8	42

CHART 13. DUODENUM-1.

	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	Total
Adeno									1		1
Sex—Male									1		1

CHART 14. JEJUNUM-1.

	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	Total
Adeno											1
Sex-Male		* *	1								1

CHART 15. ILEUM-1.

	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	Total
Malignant argentaffinoma Sex—Male					1						1
Sex—Male					1						1

Chart 16. Ascending Colon and Cæcum (7)—24. Insert = No. at cæcum each year.

	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	Total
Adeno		1(1)	1	4(2)		2	3 (3)	1	1	4	19
Malignant argentaffinoma									1	1	2
Colloid		1(1)						1			2
Papillary										1	1
Sex-Male	2	2	1	2		1	1	1	1	3	14
Female				2		1	2	1	1	3	10

CHART 17. APPENDIX-1 AN	D 1.
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	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	Total
Malignant argentaffinoma							1				1
Lymphosarcoma							.:			1	1
Sex—Male							1			1	2

CHART 18. HEPATIC FLEXURE-8.

	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	Total
Adeno	3			1		2				1	7
Colloid			1								1
Sex—Male	3		1	1		2				1	8

CHART 19. TRANSVERSE COLON-7.

	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	Total
Adeno			1		1		1			1	4
Papillary					.:					1	1
Diffuse				1	1				• •		1
Sex—Male					i		1			1	4
Female				1	1					- 1	3

CHART 20. SPLENIC FLEXURE-4.

	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	Total
Adeno		1			1		1			1	- 4
Sex-Male					1					1	2
Female		1					1				2

CHART 21. DESCENDING COLON-5.

	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	Total
Adeno	1		1	1				2			5
Sex-Male	1		1					1			3
Female				1				1			2

CHART 22. PELVIC COLON-1.

	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	Total
Adeno									1		1
Sex-Male									1		1

CHART 23. SIGMOID COLON-24.

	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	Total
Adeno	5	1		1	4	5	2		2	1	21
Colloid					1					2	3
Sex—Male				1	4	4	1		1	3	18
Female	1	1			1	1	1		1		6

CHART 24. RECTO-SIGMOID JUNCTION-21.

	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	Total
Adeno	2)	2	1	1	2	6	2	2	3	21
Sex-Male			2	1		1	5	. 2	1	2	14
Female					1	ī	1		1	1	7

Снакт 25. Rectum—69.

1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	Total
1	3	6	3	9	11	7	4	- 11	6	61
	1	2		1		1				5
								1		. 1
								1		1
i	3	7	1	7	9	6	2	11	5	52
	1	1	2	3	2	2	2	3	1	17
	1	1 3 1	1 3 6 1 2	1 3 6 3 1 2	1 3 6 3 9 1 2 1	1 3 6 3 9 11 1 2 1	1 3 6 3 9 11 7 1 2 1 1	1 3 6 3 9 11 7 4 1 2 1 1	1 3 6 3 9 11 7 4 11 1 2 1 1 1 1	$\begin{array}{cccccccccccccccccccccccccccccccccccc$

CHART 26. ENTIRE COLON-2.

	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	Total
Adeno									1		2
Sex-Male		. 1									1
Female									1\		1

CHART 27. HEAD OF PANCREAS-33.

	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	Total
Adeno	1	4	2	4	4	4		- 1	3	6	29
Simplex		1	1						1		3
Colloid		* *					* *		1		1
Sex—Male	1	5	3	4	3	4		1	4	4	29
Female					1				1	2	4

CHART 28. BODY OF PANCREAS-15.

	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	Total
Adeno	1	3		2		2	2	- 1		2	13
Simplex	1										1
Parenchymatous								1			1
Sex—Male	2	3		2		2	2	1			12
Female	* *			* *				1		2	3

CHART 29. TAIL OF PANCREAS-5.

	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	Total
Adeno				2		1			2		5
Sex-Male				2		1			1		4
Female									1		1

CHART 30. ENTIRE PANCREAS-7.

	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	Total
Adeno	٠				3			*:	1		4
Medullary								. 1			1
Anaplastic			. :		1						1
Simplex			1								1
Sex—Male			1		3			1	1		6
Female					1		.7.				1

CHART 31. LIVER-36.

	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	Total
Hepatoma	5	1	2	2	3		4	4	2	5	_ 28
Cholangioma		1				1	2	1	1	1	8
Sex-Male	6	2	1	2	3	1	6	. 5	3	5	34
Female			1							1	2

CHART 32. GALL BLADDER-21.

	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	Total
Adeno	1	2		3	1	2	4	3			16
Scirrhous										2	3
Papillary									1	1	2
Sex-Male		. 1	1	2	1	1	3	1	1	1	12
Female	1	1		1		1	1	2		2	9

CHART 33. COMMON BILE DUCT-7.

	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	Total
Adeno				1			1	1	2		5
Squamous					.:	1					1
Papillary					1				• •		1
Sex—Male								1	2		5
Female					1		1				2

CHART 34. HEPATIC DUCT-4.

	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	Total
Adeno					1	1	1			1	4
Sex-Male					1	1	1			1	4

CHART 35. AMPULLA OF VATER-2.

	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	Total
Adeno									1	1	2
										1	1
Female			* *						1		1

CHART 36. SPLEEN-1.

	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	Total
Spindle cell sarcoma									1		1
Sex—Male									1		1

CHART 37. ADRENAL-16.

	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	Total
*	2004	2000	2000		2000	2000					
Diffuse		2		2					1		5
Anaplastic				1	1		1	1		1	5
Squamous								1	1		2
Adeno			1			1					2
Melanocarcinoma		7								1	1
Neuroblastoma							1				1
Sex—Male		1	1	3	1	1	2	2	1	1	13
Female		1							1	1	3

CHART 38. RIGHT KIDNEY-20.

:	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	Total
Papillary		1				5	4	1	1	1	13
Adeno		1	1	1							5
Squamous		1	1								2
Sex-Male	2	3	1			5	4	1	1		17
Female			1	1						1	3

CHART 39. LEFT KIDNEY-19.

	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	Total
Adeno	1	1		4	1		2	1	1		11
Papillary							3	1	2		6
Squamous								1	1		2
Sex—Male	1			2	1		3	3	4		14
Female				2			2	٠			5

CHART 40. URINARY BLADDER-46.

	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	Total
Papillary	3	4	2	1	5	7	. 8	5	4	2	41
Squamous						1				1	2
Anaplastic								. 2			2
Diffuse							1				1
Sex-Male	3	4	2	1	5	8	8	6	4	3	44
Female							1	2			2

CHART 41. PROSTATE-91.

	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	Total
Adeno			2	11	13	12	9	6	6	18	83
Diffuse							4				4
Anaplastic					1	2					3
Simplex Sex—Male	1 3	4		ii	14	14	13	6	6	18	91

CHART 42. MEMB. URETHRA-1.

	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	Total
Squamous						1					1
Sex-Male						1					1

CHART 43. TESTICLE-7.

	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	Total
Teratoma	1	1				1	1	1			5
Seminoma										1	1
Embryoma					1						1
Sex-Male	1	1			1	1	1	1		1	7

CHART 44. BOTH BREASTS-1.

	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	Total
Simplex									1		1
Sex—Female									1		1

CHART 45. RIGHT BREAST-29.

	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	Total
Simplex	1	1	2	1	2	4	2	2	1		16
Scirrhous				2				1		2	5
Medullary					3		1		1		5
Colloid				1			1				2
Adeno								1			- 1
Sex—Male											1
Female		1	2	4	5	4	4	4	2	2	28

CHART 46. LEFT BREAST-28.

	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	Total
Simplex			2		1	1	4	1		2	11
Scirrhous					2	1	2		1		6
Medullary			4		1				1		6
Colloid						1					1
Adeno	1										1
Papillary							1				1
Anaplastic			1								1
Unknown					1						1
Sex-Male						1			1		2
Female	1		7		5	2	7	1	1	2	26

CHART 47. UTERUS-9 (+1).

1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	Total
		1		1				3	2	7
						- 1			1	2
				*:				1		0.11
			1	1	1 1	1 1	1 1 1	1 1	1 1 3	1 1 3 2 1 1 1

CHART 48. OVARY-42.

	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	Total
Papillary	1		2	5	. 2	1	2	1	4	2	20
Adeno	1	1			3	1	1	1	2	1	11
Cystadeno				1		1			1	1	4
Medullary	1							1			2
Anaplastic				1							1
Squamous										1	1
Arrhenoblastoma										1	1
Dysgerminoma								1			1
Teratoma							1				1
Sex—Female	3	1	2	7	5	3	5	4	7	6	42

CHART 49. CERVIX-47.

	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	Total
Squamous				2	5	9	7	2	3	4	42
Anaplastic								- 1			1
Adeno				• •		1	* *	1	2		3
rapmary								L			1
Papillary	3	5	2	2	5	10	7	4	5	4	47

CHART 50. VAGINA-1.

	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	Total
Squamous			.:							1	1
Sex—Female										1	1

CHART 51. BRAIN-50.

	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	Total
Glioblastoma	2	5	3	4	3	1	3	6	4	3	34
Astroblastoma			1	1	2			2	2	3	11
Medulloblastoma	1			1				1		1	4
Pineoblastoma				1							1
Sex-Male	2	5	1	5	3	1	1	9	6	6	39
Female			3	2	2		2	**		1	11

CHART 52. BONE-2.

	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	Total
Squamous		(orbi	t) 1		(sphenoi	d) 1					2
Sex—Male			1			1					2

CHART 53. PITUITARY-4.

	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	Total
Adeno	944					1				1	2
Atypical		1							1		2
Sex—Male		1	**			1			1		3
Female										1	1

CHART 54. SITE OF PRIMARY CARCINOMA

Type of primary carcinoma (Percentage)	Skin	Mouth	Tongue	Larynx	Pharnyx	Thyroid	Bronchogenic	Lung	Esophagus	Stomach	Small bowel	Large bowel	Recto-sigmoid	Pancreas	Liver	Extra-hepatic	Spleen	Adrenols	Kidney	Bladder	Prostate	Testicle	Breast	Ovary	Uterus	Cervix	Vagina	Ditaitown
Adeno Colloid Squamous Anaplastic Papillary Scirrhous Medullary Simplex Parenchymatous Melanotic Mixed Teratoma Basal Cholangioma Hepatoma	78 15	100	100	954	10 63 16 3	37 12 37	32 57	27 27 20 27 20	11 80 3 3 11 2	3 1	hle		90	85 1 1 8 1	-	79 2 9 9		12 12 31 12 12 12 12 12 12 12 12 12 12 12 12 12		5	91	Seminoma—14 Embryoma—14	5	47		6 89 2 2		Mosliniklo
Site of metastases Liver. Lung. Brain Kidney Pancreas Bladder Adrenals Duodenum Common duct Heart Stomach	18 18 1 .5	16	16	4 4	26 26 3		14 21 3		53 10	414		26 24 6 2	17 2 2	70 26	27 3 2	20		24	7 15	-24	18 18 2 4 1 18	14 28 28	52 51 7 8		22 22 22	7		

of carcinoma in any one site. Thus, gastric carcinoma comprised 0.31% in 1934 and 0.36% in 1943. Bronchogenic carcinoma was 0.15% in 1934 and 0.19% in 1943. Prostatic carcinoma was 0.06% in 1934 and 0.23% in 1943. Pancreatic carcinoma was 0.06% in 1934 and 1.0% in 1943.

The types of carcinoma occurring in the various sites is shown in Charts 3 to 53, and in addition, the sex incidence is also recorded. In these charts attention is called to the relatively high frequency of malignancy of the larynx, pharynx and bronchus in males as compared with females. Even though these are absolute figures, they are still impressive when the correction factor for females is used to create relative figures. The percentage of each type of microscopic picture for each primary site is listed in Chart 54. For example, 78% of carcinomas of the skin were squamous, 90% of carcinomas of the rectosigmoid were adenocarcinomatous, and 74% of carcinomas of the liver were hepatomas. In addition, the chart also presents percentage figures of the sites to which each of the primary malignancies have metastasized. On the basis of these figures, malignancy of the larynx is the most confined while that of the thyroid and testicle appears to be the most invasive.

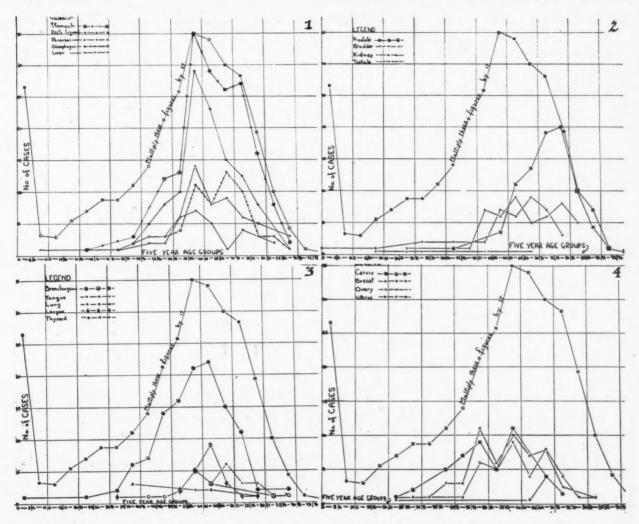
Graphs were made to trace the age incidence of 18 primary carcinomas according to more or less generalized systems. Thus, charts were made of the female reproductive system, of the gastro-intestinal glandular system, of the respiratory system including the tongue, and of the genito-urinary system, excluding the female reproductive tract. In the graphs numbered 1 to 4, these findings are represented and will be discussed individually.

On Graph 1 is shown the findings concerning the stomach, recto-sigmoid region, pancreas, esophagus and liver. There were too few cases to consider carcinoma of the small bowel and gall-bladder. One fact becomes immediately apparent, namely, that for these five primary sites, there is a more or less peak age group which is much more definite for the stomach than the liver. There were more instances of carcinomas of these regions between the ages of 56 and 60 than any other five-year period. Accompanying this graph and each of the other

three graphs is a line representing the over-all incidence of the ages of all autopsies. Each value of this latter graph must be multiplied by the figure 17 in order to present the line in correct proportion to the original graph. It has been reduced proportionately to fit into the space. It at once becomes noticeable that there is a definite similarity between this line and the lines representing the regions considered in Graph 1.

quently than any other in this group and has a peak in the 61 to 65-year group. This peak also exists for carcinomas of the larynx as well, while the peak for the lung occurs five years earlier and for the tongue five years later.

In Graph 4 there are considered the carcinomas of the cervix, of the uterus, the breast and the ovaries. There appear to be two peak periods for the cervix, breast and ovaries, and there was no incidence of primary carcinoma

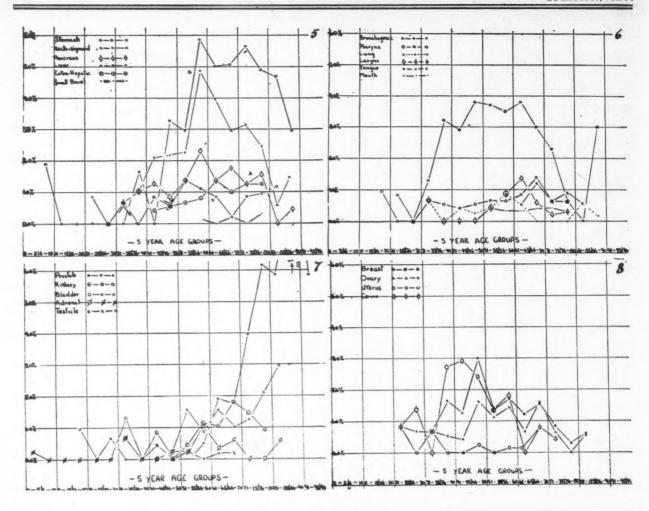


In Graph 2, portions of the genito-urinary system are considered. There were too few cases of carcinoma of the testicle to be of significance but carcinoma of the prostate, bladder and kidney are shown outlined on the chart. Carcinoma of the bladder and kidney do not have a peak age group while the prostate does, and this latter peak occurs some twenty years later than that of the gastro-intestinal system previously mentioned.

Graph 3 represents the carcinomas of the tongue, lung, thyroid, larynx and bronchi. Bronchogenic carcinoma occurs much more fre-

for these sites under the age of twenty, which was not the ease in the other systems considered above.

If further graphs are formed which take into consideration the line which represents the age incidence of all the individuals on whom a post mortem was performed, a more correct impression is obtained. In Graphs 5 to 8, the same systems as in Graphs 1 to 4 are represented and the discussion of the line representing the stomach will indicate how the figures were obtained. In the age group 21 to 25, there was one case of gastric carcinoma while there were



119 autopsies (7 x 17) performed upon individuals dying in this age group. Therefore the percentage of autopsies revealing gastric carcinoma was 0.84% (1/119 x 100). This method was subsequently followed for each of the 21 primary sites for each group. Thus, while in Graph 1, gastric carcinoma appeared to occur much more often in the age group 56 to 60, but is now seen to be spread over a 25-year period from 56 to 88 years; similarly, for the pancreas, there is a very lengthy spread from 36 to 80 years with the exception of the 56 to 60 year group in which a slight amount of peaking is evident. These graphs do definitely indicate that the possible appearance of many primary carcinomas is spread over a longer period than may be apparent to many practitioners.

Graph 6 represents the changes for carcinoma of the bronchi, pharynx and lung. Graph 7, the genito-urinary system, and Graph 8 the female reproductive system. The great percentage of carcinomas of the female reproductive system occurs in a relatively younger group for there is a distinct fading away of the graph after the age of 50. These figures may not be

entirely accurate inasmuch as a large number of these people undoubtedly die at home and no post mortem is performed upon them. In this series, there were no cases of cervical carcinoma in the 31 to 35 year age group but a significant number in the 36 to 40 age group. This would seem to have some clinical significance and in any investigation of abnormality of vaginal bleeding prior to the menopause in this age group, a diagnostic curettage or biopsy would appear to be almost mandatory.

SUMMARY

- 1. A detailed analysis of 1,214 cases of carcinoma in the Vancouver General Hospital during 1934 to 1943 is presented.
- 2. The analysis is presented according to sex, age at death, primary site of new growth, sites of metastases and the microscopic type of carcinoma.
- 3. During this ten-year period, 7,186 autopsies were performed. In the last four years, there has been an average of over 850 autopsies per year, which is indeed a vast storehouse of material for teaching purposes.

COMBINED ANÆSTHESIA, USING PENTOTHAL, CYCLOPROPANE, NITROUS OXIDE, OXYGEN*

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FOR many years, anæsthetists have adopted the practice of combining anæsthetic agents, not only with the idea of securing cumulative effect, but also with the desire to augment the advantages and offset the defects of a given anæsthetic agent.

Pentothal has been employed as a general anæsthetic agent for several years and a number of anæsthetists have reported its use combined with other agents, without however stating precisely what methods they employ.

The following represents our experience with a combination of pentothal-cyclopropane. First will be a brief review of the various techniques we employ; and then, a summary of the advantages and disadvantages we have encountered in the use of this combination.

TECHNIQUE

With regard to premedication, we give nembutal gr. 1 ss or seconal gr. 1 ss the evening before operation, followed by morphine gr. 1/6 to 1/8 and atropine gr. 1/150 one hour preoperatively. For the young, aged and feeble these doses are, of course, reduced. It is important to note that the dose of morphine should not exceed gr. 1/6 because the depressant action of morphine on the respiratory centre is greatly increased by the pentothal. Morphine is a central analgesic acting chiefly on the midbrain, hence the value of the morphine-pentothal combination in avoiding the period of excitement customary with the inhalation anæsthetics which begin their work at the cerebral cortex. Inhalation anæsthetics cut off the lower afferent pathways, while pentothal does not. However, we should guard against the danger of severe respiratory depression which occurs when too heavy a dose of morphine is used.

Pentothal likewise tends to paralyze the sympathetic nervous system, leaving the parasympathetic predominant, or directly stimulates the parasympathetic. So, various reflexes such as coughing, sneezing, laryngospasm, broncho-

spasm, will be more active. For this reason, the preliminary use of a belladonna drug becomes virtually a necessity; and we much prefer atropine to scopolamine. We have found that with the latter drug there is too much depression of the cortex, that there is a greater difficulty in judging the plane of anæsthesia, and that the patient sleeps too long after the operation.

In the actual technique of combining pentothal-cyclopropane, we have various procedures.

Sometimes, we use pentothal for induction only, giving the patient 5 to 10 c.c. of a 2.5% solution intravenously. Once consciousness is lost, we administer oxygen and subsequently cyclopropane, which is continued during the operation according to the needs of the patient. The effect of the pentothal lasts ten to fifteen minutes. As cyclopropane is synergistic with pentothal, the quantity of cyclopropane needed will be reduced in proportion to the effect and duration of the dose of pentothal given at the beginning. In cardiac cases, oxygen is given before the pentothal.

A second method is to begin and continue with pentothal during the greater part of the operation, but to finish off with cyclopropane-oxygen. In this way, the quantity of cyclopropane used is very small, approximately the amount which would be necessary for analgesia if cyclopropane alone were used. Anæsthesia deepens quickly and we are not obliged to give a final dose of pentothal for wound closure. This method is especially useful when we have already given a considerable quantity of pentothal and wish to avoid the possible toxicity of an additional dose.

Still another manner of combining pentothal-cyclopropane is to begin and maintain anæsthesia with cyclopropane holding the pentothal as a mobile reserve. Thus, we may inject the barbiturate if the period of excitement is too long; to secure good relaxation for the closure of the peritoneum; or during the anæsthesia if the patient shows signs of cardiac arrhythmia, such as bradycardia or tachycardia. Here, pentothal does not suppress the arrhythmia due to the cyclopropane, but permits the anæsthetist to diminish considerably the concentration of cyclopropane in the bag and in the blood. Thus in the presence of cardiac arrhythmia, we partially empty the breathing bag, refill it with oxygen, and increase respiratory excursion by rhythmic manual pressure on the bag. To maintain

^{*}This paper was presented before the New Brunswick Division of the Canadian Medical Association, at Edmundston, N.B., October, 1945.

anæsthesia during the time, we inject pentothal in small amounts, 2 to 3 c.c. of 2.5% solution as needed.

Another method of combining pentothaleyclopropane also proves useful at times. Induction is made with pentothal up to full surgical anæsthesia; then oxygen-cyclopropane is used to hold the subject at the desired level of anæsthesia. If, during the operation the patient becomes too light, we may deepen the anæsthesia either by injecting a small quantity of pentothal or by increasing the cyclopropane. In extra-abdominal operations we prefer cyclopropane, whereas in abdominal work, pentothal is preferable because it gives better muscular relaxation. Routinely, we continue anæsthesia with cyclopropane while the abdomen is opened, and as soon as the surgeon prepares to close the peritoneum we inject a small quantity of pentothal. Good relaxation is thus secured within a few seconds, much more quickly and effectively than if we tried to produce the same result with evelopropane. The quantity of pentothal injected from time to time to maintain anæsthesia varies from 3 to 5 c.c. of a 2.5% solution. Heavier doses are liable to cause apnœa, depending of course on the depth of anæsthesia. If such an apnæa occurs, we do artificial respiration by means of rhythmic manual pressure on the breathing bag until the body succeeds in destroying the overdose of barbiturate or until we have succeeded in washing out a sufficient quantity of cyclopropane from the circulation.

Often, pentothal is employed only during closure of the abdominal wall, especially if one has used curare at the beginning of anæsthesia. Instead of repeating the curare, we may give 5 c.c. of pentothal to secure muscular relaxation. The effect obtained is complete and may even cause respiratory apnœa for several minutes if the anæsthesia is already deep. We may associate with the cyclopropane a small quantity of nitrous oxide or ethylene as 40% of the mixture in order to stimulate respiration. If the respiration becomes too depressed, we may have a retention of carbon dioxide in the blood. This is not necessarily accompanied by hypoxia because the breathing mixture is so rich in oxygen. The retention of carbon dioxide in the blood leads to increased pulse rate, elevated blood pressure and other circulatory difficulties. Therefore, it becomes important to maintain good respiratory excursions either by manual compression of the bag or by adding another gas such as nitrous oxide or ethylene to the mixture. Moreover, we should make sure that the soda lime is sufficiently fresh.

We may use pentothal with nitrous oxide alone or with ethylene-oxygen alone, in the proportion of 50 to 70% of the anæsthetic gas. In this combination, the intravenous anæsthetic agent is used to reinforce the nitrous oxide or ethylene-oxygen in much the same way that the gas may be supplemented by the addition of ether. The use of nitrous oxide and oxygen with pentothal sodium has all the advantages of a non-explosive mixture. Nevertheless, the quantity of pentothal needed is larger when used with nitrous oxide-oxygen alone or ethylene, because cyclopropane is seven times stronger than nitrous oxide and four times more powerful than ethylene.

ADVANTAGES AND DISADVANTAGES

It may be seen from the foregoing examples how numerous are the methods in which the anæsthetist may combine pentothal with gas anæsthetics. The question remains, does the use of the combination we have described really offer any distinct advantages over pentothal or cyclopropane alone or over the other commonly employed anæsthetic agents?

By using pentothal, the induction of anæsthesia is calmer and more pleasant for the patient. There is no fear of the mask, no sensation of suffocation, no excitement stage. We avoid a useless waste of the patient's nervous energy and diminish greatly the danger of a fatal ventricular fibrillation. Certain other incidental benefits accrue. Induction can be carried out at the bedside, much time can be saved and the hazard of explosion is eliminated.

When we add the anæsthetic gas there is no spasm, no cough reflex and most important, a small amount of cyclopropane will suffice. This perhaps, is the great advantage of combining cyclopropane and pentothal; we are able to use less pentothal and less cyclopropane than would otherwise be required. In this way, toxic doses of both agents are avoided. If pentothal were used alone, the quantity required to maintain a satisfactory plane of anæsthesia would often depress respiration and circulation and prolong postoperative narcosis. Such respiratory and

circulatory depression often call for the use of oxygen, analeptics, and other anti-shock therapy,

Cyclopropane in large concentrations often results in cardiac irregularities during operation and is probably the cause of various cardiac complications noted postoperatively. Using the pentothal-cyclopropane routine, only about half the usual anæsthetic dose of cyclopropane is required and cardiac abnormalities during the course of anæsthesia are exceptional.

Cyclopropane partially compensates for insufficient preliminary medication, supplements pentothal anæsthesia and controls the coughing, sneezing, hiccup, and twitchings which sometimes occur under pentothal alone. Cyclopropane is eliminated rapidly and brings about a swifter return of consciousness. When cyclopropane alone is used, patients vomit in 50% of cases during the recovery period. In mixed pentothal-cyclopropane anæsthesia the incidence of this complication falls to 10%. Also, with pentothal, there is a sustained fall in systolic blood pressure, while with cyclopropane there is a sustained increase in systolic pressure.

Besides the advantages, however, we must recognize that there are certain disadvantages to the use of cyclopropane-pentothal anæsthesia. Both pentothal and cyclopropane dilate the capillaries, causing increased oozing of blood. Hæmorrhage therefore is more marked after pentothal-cyclopropane combination than when using either agent alone. As hæmorrhage is a principal factor in operative shock, one will do well to avoid this combination in cases where much bleeding is expected. With ether, ethylene, nitrous oxide, there is a sustained rise in systolic blood pressure, but a contraction of the capillaries. It would appear that ether or nitrous oxide and oxygen is useful in decreasing the amount of bleeding during a surgical procedure. Ether alone causes less bleeding than pentothalether, and ether-air or ether by open drop results in less hæmorrhage than ether-oxygen, because oxygen dilates vessels. Oxygen dilates small vessels and carbon dioxide contracts them.

A further disadvantage of the mixture pentothal-cyclopropane is diminution of respiratory excursion, since neither pentothal nor cyclopropane is a respiratory stimulant. A little nitrous oxide, ethylene or ether introduced into the breathing bag will help to correct this fault. Working in a closed circuit as one does with cyclopropane-oxygen permits good control of respiratory movements and enables one to do artificial respiration quickly or to control respiration where required.

Here, it is well to remark that in cases of depressed respiration one may have carbon dioxide retention even where oxygenation is good. Oxygen may diffuse into the blood but carbon dioxide does not diffuse out from it.

Respiratory movements must be sufficient to eliminate the waste product. Changes in pulse, respiration and blood pressure may be seen in the course of what seems to be normal anæsthesia. It is easy to overlook the accumulation of carbon dioxide. We must not fail to rectify conditions which may be causing carbon dioxide excess. Hence the importance of using fresh soda lime and doing artificial respiration when necessary.

During the postoperative period, a competent nurse should maintain careful watch to assure a free airway, for with respiration depressed the patient chokes easily. The patient should be carefully placed in the lateral position with head in extension. If cyanosis develops, oxygen should be administered. Coramine, metrazol, and picrotoxin are specific antidotes in pentothal intoxication. Indeed, 5 c.c. of coramine should be injected after any considerable amount of pentothal has been used. Methedrine is also very useful to control falling blood pressure during or after pentothal anæsthesia. It has a powerful, prolonged action on blood pressure without causing too much elevation; and it contracts small vessels dilated by pentothal. We must point out, however, that analeptics are used to aid intravenous therapy such as blood and plasma.

We should also be careful during the postoperative period not to risk the danger of morphine overdosage. The respiratory and cortical centres remain depressed for several hours due to the effect of pentothal, so only half the usual dosage of morphine is required. Gr. 1/6 of morphine is sufficient. We prefer to substitute heroin gr. 1/12 because of its less depressing effect on the cortex.

SUMMARY

Summing up, pentothal-cyclopropane has certain disadvantages; it favours bleeding, increases operative shock in long operations, and requires careful postoperative supervision of respiration. To offset these, the combination permits use of these agents in a wider number of cases, diminishes preoperative fear, elimi-

nates the excitement period, assures better control of anæsthesia, procures good muscular relaxation, diminishes postoperative nausea, vomiting, pulmonary and gastrointestinal complications; and has less toxic systemic effect than ether. Most important, it permits use of the two agents without fear of giving a toxic overdose of either.

We have been using this combination for several years and have had excellent results with it. While not a perfect combination, we are convinced that it is an advance in anæsthesia.

MIGRAINE: ITS TREATMENT WITH PROSTIGMINE BROMIDE*

By I. J. Patton, M.D.

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THE pain of migraine headache can be excruciating, even forcing the sufferer to thoughts of suicide, yet few physical signs can be made out to substantiate the patient's complaint. To attack a disease intelligently, its etiology must be known, and the fundamental cause removed, if possible. Failing this, the next best approach is through a study of its pathological basis, both anatomical and functional, with a view to correcting the disturbance. This appears to be the course which we must follow with migraine. In the present attempt to do so, none of the statements which follow are new, but the picture which they present, and the conclusions to which they lead, may help to clarify the problems of causation and treatment.

The anatomical pathology of migraine need not detain us. In the nature of things, it is and must remain obscure, since patients do not die of an attack, and what changes there may be are transitory and reversible.

We have first to note its resemblances to epilepsy and to allergy. All three appear to have a constitutional factor, a diathesis, although different regions or systems are selected as the point of attack. In the family and personal history of patients suffering from any one, there is a high incidence of the other two. In all, there are indications of nervous imbalance. The relation of epilepsy is the least clear-cut, and many observers deny that it is a migrainous or

allergic equivalent, but it is at least suggestive that both epilepsy and migraine exhibit the same four stages—prodromata, auræ, attack, sequelæ—and that all three types of attack can be precipitated by mental tension or emotional strain.

It should not be concluded that migraine is allergic in nature. Only rarely can a specific allergen be incriminated. The point to be made is that there is in each a fundamental neuro-vascular dysfunction. Hormonal imbalance is often found in both conditions, and the influence of menstruation, pregnancy, and the menopause is undisputed.

The above considerations would suggest that a similar mechanism is responsible for both types of attack, and perhaps for epilepsy as well, and it is possible that this mechanism may be either an abnormally facile release of histamine-like (H-) substance, or an abnormal sensitivity to it. Histamine, generally distributed in normal cells, is ordinarily inert, but when released, by appropriate methods, into the tissue fluids, has an intense vasodilator action.

Goltman divides the mechanism of the migraine attack into three stages: (1) Vasomotor spasm, leading to temporary ischæmia of parts of the brain, causing the aura. (2) Secondary vasodilation, with resulting ædema of the brain, causing headache. (3) Temporary hypersecretion and hyperabsorption of spinal fluid, tending to equalize the intracranial pressure, and producing the polyuria which is frequently noted among the sequelæ.

One can hardly fail to note the resemblance to the so-called "triple response" to intradermic histamine injection: vasodilation (red flush of skin), followed by increased permeability and local ædema (wheal).

On the other hand, Hare and Cushing consider the pain of migraine to be caused less by disturbances in the cerebral vessels than by dilation of the cranial arteries, particularly the branches of the external carotid. A point in favour of this view is the relief of migraine headache, when the amplitude of pulsation in the temporal arteries (and therefore in the other branches of the external carotid) is reduced by digital pressure on the carotid artery of the affected side. The effectiveness of injection of ergotamine tartrate, which acts in a similar manner on the vessels, also bears out the contention of Hare and Cushing.

Both hypotheses explain some of the observed phenomena, but not all. I should like to venture

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the suggestion that both may be substantially and simultaneously correct. The combined hypothesis would postulate the following events:

1. Angiospasm, of both intra-cerebral and extra-cerebral intracranial arterioles, raising pressure in the corresponding arteries, and leading to

2. Vasodilation of both cerebral and meningeal arteries, followed by exudation, increasing the pressure both inside and outside the meninges. It is possible that spasm persists in the arterioles, enhancing this effect.

3. Hypersecretion and absorption of cerebrospinal fluid, slowly restoring cerebral pressure to normal and terminating the attack.

4. Where ergotamine tartrate is exhibited, its action is two-fold. It causes constriction of the dural arteries, and it relieves spasm in the cerebral arterioles, due to sympathetic inhibition. The cerebral blood-flow is thus increased and the removal of exudate hastened. That ergotamine tartrate does produce these effects on the intracranial blood-vessels has been shown by Pool and Nason, while Lennox, Gibbs and Gibbs have demonstrated a moderate, prolonged increase in cerebral blood-flow, following ergotamine tartrate administration.

The idea of the primarily angiospastic character of migraine is corroborated by two facts: first, the similar origin of other manifestations preceding, accompanying, or at times replacing the headaches: e.g., scotomata, pallor, myalgia, dizziness, hypertension, even occasionally hemiplegia or aphasia; and, second, the abortion of an attack in the preliminary stage, or its relief when established, by the spasmolytic action of ergotamine tartrate or intravenous papaverine hydrochloride, or oral carbachol.

The, perhaps rash, assumption, that the similarity of the above-suggested mechanism to allergic reactions and to the effects of histamine might indicate a line of therapy, led to the consideration of histamine desensitization. ever, in view of the number of annoying injections needed, the danger of reactions, the cost to the patient, and the inconclusive results hitherto reported on histamine desensitization for allergic conditions, it was felt that an oral substitute would be highly desirable, could an effective one be found.

Prostigmine bromide fills the bill here. Its action as a parasympathetic stimulant, inhibiting the action of cholinesterase, produces vasodilation of peripheral vessels, chiefly arterioles; it is

highly effective by mouth; and its cost, in the dosages needed is ludicrously low. A few years ago, Pelner and Aibel accidentally discovered that oral desensitization by prostigmine was effective in a case of histamine headache, and later found similar results in headaches of the migraine and hypertensive types.

In a recent series of six patients of my own, with histories of migraine of from 8 to 25 years' duration, the response to prostigmine was similar: 2 reported moderate improvement, 3 marked improvement, and 1 declared it was "a miracle".

The technique of treatment is as follows: One 15-mgm. tablet of prostigmine bromide is dissolved in an ounce of distilled water. The patient is instructed to take it three times daily, beginning with one drop, and increasing by one drop each dose, until she is taking 10 drops three times a day. After continuing at this dosage for 1 week, she drops to a maintenance-dose of 10 drops twice weekly, and if any signs of impending headache are noticed, takes an additional 15 to 20 drops.

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THE ROLE OF RIBOFLAVIN IN MIGRAINE

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THE artificial synthesis of riboflavin was first accomplished in 1937, and with an adequate supply for clinical investigation available, it was not surprising that certain syndromes became early identified as due to ariboflavinosis. The intervening years have but served to prove the accuracy of these observations.

In 1939, Spies, Bean and Ashe¹ described eye lesions characterized by burning sensations, conjunctivitis, lachrimation and failing sight, some of which responded to riboflavin, and a year later, Spies, Bean, Vilter and Hubb2 described the same eye signs and, in particular, a peculiar violet congestion of the conjunctival vessels. They noted that these symptoms responded to riboflavin, and that its discontinuance resulted in a reappearance of these visual disturbances.

The stimulus for this present paper, however, was furnished by an article published in the *Canadian Medical Association Journal* of July, 1943, entitled "The effect of riboflavin on corneal vascularization and symptoms of eye fatigue in R.C.A.F. personnel", by F. F. Tisdall, et al.³

This article dealt with the occurrence of peculiar eye complaints in Naval fliers exposed to glare of the sun reflected from the ocean's surface. The complaints of these men were "tiredness of eyes, aching eyes, watering of eyes, sandy sensation under lids, dizziness, headaches, reading intolerance and decreased visual acuity". Sixty-seven per cent of the men studied suffered from two or more of the above symptoms. The article explained these symptoms as due to corneal vascularization. Dr. J. V. V. Nicholls, one of the co-authors of a subsequent article4 has assured us that the subsequent unfavourable criticism of the first paper, in so far as corneal vascularization was concerned, was justified. The significant part of the article, however, was the statement that these men were relieved of their complaints by the use of riboflavin. The accuracy of this later observation has never, to our knowledge, been questioned and is in line with the earlier conceptions of ariboflavinosis.

I was impressed with the similarity of these complaints to those of a few of my patients suffering from ophthalmic migraine. I decided, accordingly, to investigate this possibility in so far as ophthalmic migraine was concerned. Two of these cases were started on riboflavin mgm. 10 daily, similar to the dosage suggested by Tisdall. The results from the first were more than significant.

Since then my study has progressively widened and gradually as the series increased, it became obvious that the results in my early cases were no mere coincidence.

The present report is based on 19 migrainous individuals whom I have had under observation for periods varying from several months to two and one-half years. An additional group of 15 cases has not been included because of their more recent observation. This latter group, however, has in the main supported in

every way the conclusions which I had previously arrived at.

Of the group under discussion, 15 were females and 4 were males. Four were of the ophthalmic migraine type, while the remainder, 15 in all, came within the classification of the simple migraines.

The length of time the individuals had suffered from their attacks was as follows: 3 for a period of 2 to 5 years; 4 for 5 to 10 years, and 12 for 10 years or longer.

The symptoms complained of by the ophthalmic migraine group were remarkably constant. Tiredness of the eyes, aching eyes, sandy sensation under the lids, reading intolerance and decreased visual acuity were all present. In addition, all complained of the so-called "fortification spectra", but the most striking complaint was the extreme sensitivity to light.

There was no such uniformity of complaints, however, in the simple migraine group. Here some had few ocular signs and a predominating tendency to nausea and vomiting, while, with others, the reverse was the case. Here again, however, the sensitivity to light was the most characteristic complaint. Thirteen of these noted this fact. Ten complained of reading intolerance, 4 of the fortification spectra and 2 of aching eyes.

There was, in addition, a marked congestion of the conjunctival vessels noted in many of the cases, the peculiar colour of which approached very closely the violet conjunctival congestion mentioned above by Spies et al.² as definitely due to riboflavin deficiency.

I assumed early in my investigation that all of the migraines arose from a common origin and from the first treatment was directed to the correction of the cause, while the alleviation of the individual attack was a secondary consideration.

The original method of giving the riboflavin was 10 mgm. daily in divided dosage. Subsequently, this proved inadequate. Many failed to respond to this, but immediately showed improvement when larger dosages were given. For this reason, all cases are placed routinely on mgm. 5 riboflavin three times a day; this to be continued for several months' time, after which the dosage was varied to suit the individual requirements, the individual himself adjusting the dose from day to day to suit the needs of that particular day. This

was exemplified in one of our patients in whom a train journey always initiated a typical migraine attack. The taking of 5 mgm. hourly for several hours completely protected her from the anticipated seizure.

For many months several of my cases continued to have prodromal signs of oncoming attacks, but it was found that this tendency diminished as the months passed. With these, at such time, the giving of hourly doses of 5 mgm. until the symptoms subsided or otherwise until five or six doses were taken, completely dissipated the symptoms of the attack. I had abundant evidence of this fact. Eight of my cases found this of inestimable value, not only as an active procedure in preventing the attack, but also in furnishing a method of mental protection against the fear of an ever-present hazard.

The length of time this continuous riboflavin therapy should be continued is variable. Five of my cases were able to discontinue it after a couple of months' time with complete immunity from attacks. The remainder felt it essential to their well-being to carry on the dosage indefinitely. An interesting observation in this connection was the voluntary suspension of all treatment in three of this latter group after freedom from all attacks for periods varying from six months to one and a half years. Each of these suffered typical seizures within six weeks' time, and resumption of treatment resulted in no subsequent attacks.

The success of this routine can best be shown by the following figures:

1. Every case reported a marked improvement in general well being.

2. The four ophthalmic cases were relieved of all attacks either dramatically from the start of the therapy or within a few weeks' time

3. Ten of the simple migraines reported complete cessation of their attacks, while three of the remainder were markedly improved both in the lessened frequency and the severity of their attacks. The two remaining cases are difficult of evaluation. One was definitely improved, and the other, while noting much improvement, had failed to follow the treatment with any degree of continuity. Certainly this group of five demonstrated very clearly the necessity of prolonged therapy, particularly in

the simple migraine group. Had it been stopped in the first two months, there would have been very little evidence of improvement.

What conclusions, if any, is it possible to deduce from all of the above? Migraine, like epilepsy, has a peculiar tendency, once the attacks are established, to continue to recur at varying intervals for many years, each attack an exact duplicate of its predecessor. This peculiarity is perhaps an hereditary characteristic. There does seem to be a precipitating factor, however, without which the tendency would be incapable of fulfilment. All of the visual disturbances above discussed tend to create a definite ocular fatigue, which may well be the precipitating factor.

This was apparent in many of this series. Four individuals feared a train journey; two, a visit to the movies; two, driving a car in traffic; one, the bright tropical sunshine and, finally, the office worker who, on occasion had to transfer figures from one page in his ledger to the next. These fears are but an attempt on the part of the individual to protect himself from this fatigue, a defence mechanism which is no longer necessary when the condition creating this fatigue syndrome is removed. In this connection, physical defects, such as errors in refraction, ocular muscle imbalance, mild depression psychosis, anæmia, etc., contribute to this whole syndrome and in so far as they do, their correction is essential if complete success is to be achieved. Such, we believe, is the rôle of riboflavin in migraine.

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RÉSUMÉ

S'inspirant des résultats obtenus avec la riboflavine dans l'hypervascularisation cornéenne, l'auteur a traité 19 cas de céphalée migraineuse, soit simple, soit ophtalmique avec une dose variable, mais constituée en moyenne par 5 mg. 3 f.p.j. Tous les sujets moins un furent guéris; le 19ième n'a pas répondu au traitement parce qu'il a suivi sa médication assez irrégulièrement. Cette découverte est fort intéressante et provoquera de nouvelles recherches dans le domaine de l'épilepsie.

JEAN SAUCIER

ARTERIO-VENOUS FISTULA*

By Edgar M. Cooper, M.D. and G. Gavin Miller, M.D.

Montreal

ARTERIO-VENOUS fistulæ are usually of traumatic origin, which explains their frequency in warfare. They may also occur as the result of shooting accidents, stab wounds, puncture wounds and surgical procedures, such as in the use of skeletal traction by pins. Occasionally they occur spontaneously, as when an arterial aneurysm ruptures into an adjacent vein or, consequently, as seen in cavernous aneurysm.

When an artificial opening is produced between vein and artery, the development of sequelæ will follow on the physiological differences inherent in the arterial and venous circulations. The blood in the arteries pumped at a pressure of 100 to 180 mm. of mercury passes suddenly into the venous circulation, shortcircuiting the arteriole and capillary bed and markedly lowering the peripheral resistance. The immediate effect will depend upon the size of the vessels involved as well as upon the size of the communication. In a large vessel so much blood passes into the vein that a marked lowering of blood pressure or even death may result. However, in most cases this does not occur, and a lowering of diastolic pressure due to a lowered peripheral resistance is usually noted, the general systolic pressure being more or less maintained.

In the artery below the fistula marked reduction of the blood flow causes a contraction of the vessel, with lowered blood pressure below this point, and frequently loss or diminution of pulsation in the distal vessels, with coldness, weakness, and if not remedied some atrophy of the extremity distal to the lesion. The vein on the other hand taking over an unaccustomed load becomes distended, and, with increasing venous pressure returns more blood to the heart at an increased pressure. To maintain circulation the heart must work harder and so beats more rapidly and more strongly, thereby increasing output to handle the increased intake. This

finally leads to dilatation and hypertrophy of the heart.

The artery above the fistula dilates and carries more blood to the fistula due to the decreased resistance in the artery. This decreased resistance, as stated, is due to the avoidance of the peripheral resistance of the capillary bed, and the easy shunt through the fistulous opening into the non-resistant vein.

It is not our desire in this brief report to go into a detailed discussion of the historical developments leading to our present knowledge of arterio-venous fistula. It is perhaps sufficient to state that as early as 1757 William Hunter quite accurately described an abnormal communication between artery and vein. Perhaps we must credit Halsted and the surgical school he created at Johns Hopkins with laying the foundation of our present knowledge. A study of Mont. R. Reid and Johnson McQuire's article in the Annals of Surgery, 1938, will well repay anyone who wishes further information on this subject.

CASE REPORT

Mr. A.C., aged 28, was admitted to the Royal Victoria Hospital, Montreal, on February 21, 1944, complaining of weakness and cramps in the right leg, which he states have been present for the past eighteen years, and dizziness, which had been present for the past five years. He gave a history of playing with a .22 calibre rifle in 1926, which was accidentally discharged. The bullet penetrated the right lower quadrant of the abdomen and did not come out. The patient was hospitalized for fifteen days, during which time an exploratory operation was performed, and numerous perforations of the intestine were repaired. Four days after discharge from the hospital he was re-admitted for bleeding. Another operation was performed, but the details of the operation could not be ascertained. He remained in the hospital fifteen days, when he was again discharged.

Since the accident, he states he has noticed a weakness in the right leg, which becomes more marked upon exercise. When walking upstairs, he notices that after about fifteen steps his leg becomes so tired that he has to lift it up to the next step. He states that on standing his leg tires very quickly; when lying down, he says that cramps are often present in the leg, but they are relieved by changing the position of the leg. He has noticed that when standing he cannot lift up the toes of his right foot.

For the past five years he has had brief attacks of faintness. These attacks occur daily and last about a minute. Recently, on two occasions, he has collapsed. Examination: temperature 98.2: pulse 92: blood

Examination: temperature 98.2; pulse 92; blood pressure right arm 136/76; left arm 130/66; right leg 90/70; left leg 185/85.

There is a palpable thrill over the right external iliac and femoral arteries. The greatest intensity is over the right external iliac artery. A bruit is present over these vessels.

The radial pulse is regular in rate and rhythm. It is of moderate volume, and somewhat collapsing in character. The heart shows nothing unusual. The dorsalis pedis and posterior tibial vessels are palpable on the right. The veins are engorged and tortuous over the suprapubic region, extending from one femoral canal

^{*} Read at the Seventy-sixth Annual Meeting of the Canadian Medical Association, Section of Surgery, Montreal, June 14, 1945.

From the Surgical Department, Royal Victoria Hos-

to the other. Circumscribed brownish pigmentations are present over the right tibial region, and varicosities are present over the ankle, calf, and thigh. There is no edema. A foot drop is also present.

Blood Wassermann was negative and the hæmogram was normal. An attempt to localize the fistula by an

angiogram was made, but it was not successful.

The bullet was localized to the right of the midline of the sacrum, embedded in the sacrum, and in a line with the pedicle of the third sacral segment. About one and one-half inches lateral to this was a calcified area, corresponding to the area of pulsation.

X-ray of the heart showed definite enlargement and the cardio-thoracic ratio was 58%. Electrocardiogram

showed some ventricular myocardial changes.

On March 16, 1944, operation was performed under spinal anæsthesia, nupercaine being used. A right transrectus incision was made, avoiding scars of the previous operations, and the bullet wound in the abdomen. On coming down to the peritoneum it was decided to re-flect this from the lower portion of the wound, but owing to the adhesions posteriorly, this did not appear possible so the peritoneum was opened. On examination the external iliac vessels were found to be dilated. The external iliac vein appeared to be attached to the artery about one inch below the bifurcation of the external and internal iliac arteries. Here it showed a wide and internal iliac arteries. dilatation and a marked palpable thrill could be felt. The common iliac artery was freed and ligated with tape, including a subber tube for temporary ligation. An attempt was made to free the external iliac artery from the scar tissue, but this resulted in considerable hæmorrhage, so it was clamped and the dissection carried down to the lower portion of the sac. It was necessary to cut through Poupart's ligament, exposing the femoral vessels. A quadruple ligation of vein and artery above and below the fistula was carried out. On the posterior aspect of the venous dilatation considerable calcification was found, involving the posterior wall of the sac and also extending into the tissues about the sac. The mass was freed up to the external iliac artery and vein above the fistula, where the vessels were ligated and cut between ligatures and the mass removed. iliac vessels were dilated. There was no apparent change in the circulation of the foot, the dorse is pedis and

the posterior tibial arteries were still pulsating.

Pathologically, the specimen showed a mass concation was attached to the walls of a large thin walled open blood channel. The wall was 0.5 to 0.75 mm. in There was a communication between this channel and a blood vessel, the diameter of the communication being 0.5 c.mm. and the wall of the blood vessel was 1 mm. in thickness.

The postoperative course was uneventful. X-ray of the heart one month after operation showed the cardio-thoracic ratio to be 44%, a reduction of 14%.

The pulse before the operation was 92. The blood pressure at the beginning of the operation was 130/70 and the pulse 70; after ligation of the vessels blood pressure was 150/90, the pulse 104. Then there was a gradual drop, so that on leaving the operating table the blood pressure was 122/80, and the pulse rate was 90.

Blood pressure on the ward was 132/78 and on leaving the hospital nineteen days later, it was 112/76.

Examination on March 1, 1945: the right leg is practically the same as the left, with the exception that the right calf is one inch greater in diameter. There is still a right foot drop, but not as marked as previously. Pigmentation over the right tibia is still present. He complains of the right leg being weak. The right leg is warm where it used to be cold and he states the leg is still heavy. The dizziness is gone. He is now working. Blood pressure 98/60. The right dorsalis pedis and posterior tibial arteries are pulsating. X-ray of the heart shows the cardiothoracic ratio to be 49%.

Several previously recorded findings were observed in this case. These were the thinning and dilatation of the artery or "venification of the artery" above the fistula, and the narrowing of the artery below; the "arterialization of the vein'; the enlargement of the heart, and the impairment of the circulation; blood pressure in the right leg 90/70 and in the left 185/85; the marked development of superficial varicosities; the great development of collateral circulation, so that following the ligation of the external iliac artery and vein the pulsations of the vessels in the foot were still palpable. Another interesting observation was the calcification present on the posterior aspect of the venous dilatation.

The fainting spells and attacks of weakness are the results of changed circulation. The thrill and bruit over the right external iliac and the transmission of the thrill down the vessels of the leg are expected clinical objective

This patient was unable to extend the toes of his right foot, which disability has still persisted for one year since operation. It is difficult to suppose that this originated at the time he received his abdominal wound, though the possibility has not been ruled out. Mont. Reid reported three cases he considered to be secondary to the arterio-venous fistula; one due to infiltration of the nerve by varicose veins, another due to the scar tissue from the injury, and finally one due to pressure from the pulsating sac, which was relieved after excision.

This patient was not examined for Branham's bradycardia phenomenon, or should it be said the results of this examination were not recorded, as it was found difficult to close the fistula in the depths of the abdomen. This is a useful test and depends on closure of the fistula, when the pulse may slow and the general arterial systolic pressure may rise. This is one of prognostic importance as it shows that the heart muscle is not seriously affected.

The question of the time to operate did not arise in this case because of the length of time that had elapsed since the injury and his operation. If an operation must be performed at the time of the injury because of hæmorrhage, infection or cardiac damage, every effort must be made to preserve the continuity of the vessels. Since the injuries to the vessels

are always partial, it may be possible to repair them by lateral suture now that prothrombin time can be delayed by the use of heparin or dicoumarol.

It is usually wise to delay operation from three to six months after the fistula has appeared, to allow the development of a collateral circulation, and to allow the tissues to recover from the trauma and danger from relighting a quiescent infection.

The operative procedures for the cure of an arterio-venous fistula are many, but the essential thing is to eliminate the possibility of blood flowing again through the fistula.

Briefly, the operative procedures used as described by Reid are:

1. Excision of both artery and vein at the site of the fistula, with quadruple ligation of the vessels. This has given excellent results and was the method used in this case.

2. Ligation and division of the involved vessels and transfixion occlusion of the fistula. This has been done where the hazards of total removal have been too great.

3. Closure of the fistula by means of dividing and twisting the vein. This procedure is described by Reid and McQuire where it was impossible to expose the vessels, either proximal or distal to the fistula.

4. Closure of the fistula with restoration of the vein and artery. The danger in this method has been either air emboli or blood clot breaking away from the operative site and producing a pulmonary embolism.

5. Suture of the fistula with restoration of the artery and ligation of the vein. This is a good procedure in early cases where there is no danger from sudden restoration of normal blood pressure. In late cases with a good collateral circulation it is not necessary, and there is the danger of a true arterial aneurysm developing after the closure of the fisula.

6. Ligation of artery and vein. It is necessary to ligate all intervening branches for success, otherwise there may be a return of the fistula.

7. Ligation of the canal of communication. This is dangerous and rarely possible because of technical difficulties, also there is danger of the sutures cutting through.

8. Proximal ligation of the artery is dangerous and should be avoided if possible. In the extremities it is often followed by gangrene as the fistula still remains, and there is not enough force to push the blood beyond it.

SUMMARY

A case is reported of arterio-venous fistula involving the external iliac artery and vein. This case presented the classical symptoms, and also certain complications, such as cardio-circulatory changes, and weakness and fainting spells. Operation was successfully carried out with complete cure. This consisted of quadruple ligation of artery and vein above and below the fistula, together with excision of the fistula. Various physiological aspects have been discussed together with a brief review of the various operative procedures which have been practised.

CASE REPORTS

HEREDITARY ECTODERMAL DEFECT

By Edward L. Margetts, B.A., M.D., C.M.

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Congenital malformations of the ectoderm have been reported by various writers. Often these defects are familial and hereditary. They may be manifest in one ectodermal structure or in several. There is one condition, usually termed "congenital ectodermal defect", which has been described as a fairly discrete syndrome, having hereditary maldevelopment of skin, hair, teeth and nails. Discussion in this paper will be limited to this abnormality.

M.R., male, thirty years of age, was admitted to a surgical ward of the Royal Victoria Hospital, Montreal, for treatment of an acute paronychia of the left middle finger, with lymphangitis and axillary lymphadenitis. This in itself was of no special interest and cleared up under treatment.

The patient's unusual appearance merited some study. He was of average size, well muscled, and had normal external genitalia. His scalp hair was fine, dry, light brown in colour, and quite thin, with considerable areas of patchy alopecia. The axillary and pubic hair was very scanty, and chest hair was absent. The facial hair consisted of a fine down, mainly upon the chin. He had only shaved three or four times in his life. The eyebrows were of the same type of hair and were strikingly sparce lateral to the supraorbital notch, i.e., in the outer two-thirds. The skin was of fine texture. The sudoriferous glands functioned well; but the selferous glands did not. The facial features were interesting. They at first suggested acromegaly. The patient had a sloping forehead with unduly large bony prominences over the regions of the frontal sinuses (Fig. 2). He had an irregular, raised, brownish excrescence above the angle of the right jaw, which he stated had been present since birth, and was once partially removed by a physician.

a physician.

The hands were most interesting. They were of ordinary size, except for the fingers, which were very large, particularly near the tips, where the pulpy regions presented a swollen, "meaty" appearance. All ten

fingernails were deformed in the same way. The nails were thick and tent-shaped, with the free edges somewhat incurled, had no lunulæ, and were of a mottled dirty brown colour (Fig. 1). Several showed faint transverse depressed striations. The "tunnels" between the nails and nail beds contained irregular shreddy nail substance, in several fingers free, and in others embedded in matrices of soft yellowish material which could be removed easily with a curette. The fingers were very clumsy, and incapable of fine movements. The patient said that he had often experienced infected fingers, and added that several times when he had caught his fingers the nails had been avulsed. The palms exhibited a high degree of generalized hyperkeratosis. The toenails were not of the same structure as the fingernails,

four maternal aunts. His father (alive) has no defects, nor has his sister; but his brother has defects. The brother is married but has no children. The patient is married, and has two daughters, neither of whom is affected.

During his stay in the ward, the patient was melancholic, and his appearance reflected his mental state. He showed a perpetual frown, was never seen to smile, and his upper eyelids formed inverted "V's" resembling the familiar Veraguth's folds seen in the severe depressions. He complained of fatigue, and said he often had these episodes of "tiredness" in the hot weather. Seen two weeks after his sojourn in the hospital, the patient was not melancholic, and smiled when amused. He had reached as far as the third grade





Fig. 1.—Note "tunnelling" of fingernails, sub-ungual shreds, "meaty" fingertips, and hyperkeratosis palmaris. Fig. 2.—Note melancholic expression, Veraguth's fold, alopecia, downy beard, birthmark above angle of jaw, prominent frontal sinuses, and sparse outer two-thirds of eyebrows.

but were atrophic and irregularly heaped up. The soles showed the same type of marked hyperkeratosis as seen in the palms.

The patient had no teeth: he informed the examiner that he had pyorrhea at an early age and that his teeth were loose and fell out. Physical examination otherwise revealed nothing, except the melancholic facial expression to be described later.

Microscopy revealed no evidence of onchomycosis. Syphilis serological tests were normal. Complete blood examination revealed no morphological or functional abnormalities. Blood sugar, phosphorus, calcium, non-protein nitrogen, creatinine, uric acid, and total proteins were normal. Cholesterol was low, 112 mgm. %. Urinalysis was negative. X-ray of the skull was normal except for the demonstration of large frontal sinuses. A vitamin A utilization curve was done, but a technical error invalidated the results, and unfortunately it was impossible to repeat the test. Basal metabolic rate was normal.

Interrogation of the patient revealed the hereditary history of his condition. He stated that he is of French-Canadian stock, pure as far as he is aware. His ecto-dermal defects have always been apparent, and were also present in his mother (who died at the age of forty-two, cause unknown), four maternal uncles, and

in school, became an errand boy, then a grinding machine operator in a meat factory, a job which he fulfilled satisfactorily until his hospitalization. He was very retarded mentally, spoke both French and English poorly, could write simple words in the former, but made bad mistakes in spelling, even in his own signature. His arithmetic was fair, although he was slow in carrying out problems. His knowledge of general information was extremely inadequate. The patient was oriented as to place and person, knew the year and the month, but was unable to name the date or day of the week. He was not spontaneous at all during his depressed periods, but at other times would offer some discourse of a simple nature, and would confine himself well to the subject of conversation. He was very suggestible, and easily flattered.

Clouston³ has discussed fully a series of patients having "hereditary ectodermal dystrophy" with malformed nails, seant hair, hyperkeratosis, increased skin pigmentation, and poor teeth. He remarked especially on the eyebrows, which were thin in the outer two-

thirds, abruptly limited by the supraorbital His series was of French-Canadian origin, but he states that it was familial and not racial. Clouston computed that there are probably 6,000 cases in America. Previously, Jacobsen⁵ had reported cases which may have been descendents of Clouston's larger group. Joachim⁶ traced a French-Canadian family, finding ectodermal defects through six generations. His cases had almost complete absence of scalp, pubic, axillary, and eyebrow hair. The fingernails showed subungual "tunnelling" (much the same as in the nails of my patient, described above) and the toenails were atrophic and small. Scully and Livingoods described defects of hair and nails in people of Slavic descent. Brain2 wrote on a case of ectodermal defect in a patient having nail dystrophy, alopecia, thin eyebrows, no pubic hair, and stressed the presence of horny plaques (tylosis) on palms and soles. Hardwick4 discussed two families, the one associated with milia and hyperkeratosis subungualis, and the other with baldness, which were inherited through several generations. Templeton9 recorded a hereditary dystrophy which was limited to the ulnar half of each thumbnail. Tobias11 mentioned several other defects which may be found, such as ichthyosis, epidermolysis bullosa, and premature or late eruption of the teeth. Murray⁷ stressed that people having congenital malformed nails and fingers are prone to injure themselves, and suffer paronychias, etc. In the same paper he presented four cases of hereditary hypertrophy of the nail beds in patients giving histories of erupted teeth at birth. Barrett¹ studied hereditary hair and nail defects, and mentioned the concomitant presence in many of these patients of mental and nervous disorders, such as feeble-mindedness. In his group, Clouston³ commented upon the considerable variation in mentality of his patients.

Acromegalic features in some of these patients suggest pituitary dysfunction, although true acromegaly has not been described in congenital ectodermal defect. Adrenal and thyroid gland dysfunction, syphilis, avitaminoses, and fungus infections may cause disorders simulating the condition. All these conditions must be considered and a hereditary history must be obtained before a diagnosis can be made of hereditary ectodermal defect.

THERAPY

Treatment in cases of true hereditary ectodermal defect is largely symptomatic, as may be supposed. Often the patients are excessively conscious of their deformities, and as a result may develop quite serious mental reactions. These, if discovered at an early age, may usually be prevented by adequate psychotherapy. Congenital hair and nail dysplasias must not be confused with dystrophies due to thyroid, adrenal and pituitary dysfunctions, or to syphilis, avitaminoses or fungus infections, in which antiluetic, medical, and surgical treatment may be successful. Thompson¹⁰ has tried x-ray therapy on a case of fourth generation defect of finger and toenails, and claimed beneficial results.

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DISCOID CARTILAGE OF THE KNEE

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Disc-shaped anomalies of the external meniscus of the knee joint still constitute a rare finding. In this hospital in the past 20 years only 16 patients were operated upon for internal derangement of the knee. In that small group of arthrotomies, 5 were found to have a disc-shaped anomaly of the external cartilage and in one case it was bilateral. Of the 16 cases (17 knees), 9 (10 knees) were for derangements of the external cartilage. There was a history of definite trauma in only 6 of the 16 cases. Only one of the discoid cases gave a history of mild The youngest case with a discoid cartilage was 5 years old and the eldest was 13 years old. We therefore concur entirely with Ober who states,

[&]quot;Internal derangement of the knee in children, due to injuries of the semi-lunar cartilages is extremely rare. Lesions of the external semi-lunar cartilages in children are much more common than those of the internal cartilage.'

The condition is thought to be due to a persistence of the embryonic form of the cartilage which is disc-shaped.

Signs and symptoms.—Painless or painful symptoms may be registered at any age but are more likely to occur in childhood and adolescence. Attention may be attracted to the knee after a trivial injury. Unless there is gross tearing of the external cartilage, the common complaint is a "snapping sensation" on active flexion or extension. This complaint is usually of a persistent nature dating from the onset of symptoms. It is usually not associated with synovitis except possibly for the initial episode of injury, if such existed. Difficulty in walking over rough ground and down stairs is not an infrequent complaint. (This, of course, may be a complaint with any derangement of a cartilage). A palpable tender mass may be felt and seen "popping" in and out along the lateral joint line anterior to the collateral ligament. Its prominence is increased on extension. Due to stretching of the external collateral ligament an increase of medial joint play is often found when the knee is flexed. Atrophy of the quadriceps may be found in the more troublesome cases. X-ray examination usually reveals widening of the lateral joint space.

Operative removal appears to give a satisfactory cure.

The following is a complete report of the most recent of this series with bilateral disc shaped external cartilages.

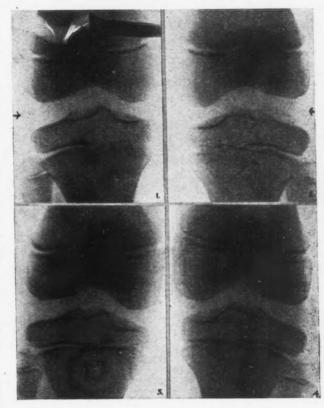
J.W., a healthy male child, aged 11, reported to the surgical out-patient department on June 8, 1945. A history was obtained that for the past 2 years a "twitching" sensation had been felt in both knees. It was noticed very frequently while walking. However, the right knee began to trouble him about 4 months ago. This complaint was in the nature of pain in the popliteal area on flexion and extension and was occasionally felt on the anterior aspect of the joint as well. On examination he walked with his feet turned out and did not fully extend the knees. When urged to walk normally one could occasionally hear a "thudlike" noise which he said arose from the left knee. There was full range of flexion and extension in both knees. There was abnormal laxity of the external collateral ligaments with the leg flexed. On the left side an intermittent tumour could be felt and seen in the lateral patellar fossa. It was most prominent at the end of extension. In both knees an irregularity of movement with a "thud" could be felt, usually at a point around 30 to 45° of flexion. There was no difference in the measurement of the circumference of the

X-rays (Figs. 1 and 2) show a widening of the lateral joint space as indicated by the arrows.

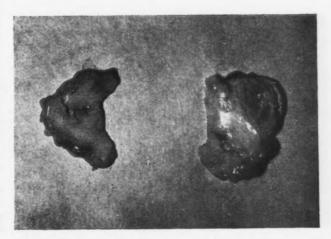
July 8, 1945.—Admitted to hospital with a diagnosis of bilateral external discoid cartilages. Quadriceps exercises were started.

July 13, 1945.—Operation: general anæsthetic. Tourniquets applied about both thighs, and the legs flexed

over the end of the table. The right knee joint was opened first through a short slightly curved vertical incision between the lateral border of patella and the lateral condyle of the femur. The outstanding feature was the huge white external cartilage completely covering the visible joint surface of the tibia. It was completely removed after one had demonstrated the 'clunk'' on reaching full extension. The left side was then done in a similar fashion and here a slightly smaller external cartilage was removed. Firm pressure bandages were applied and the tourniquets removed. Quadriceps exercises were resumed. The bandages and sutures were removed on the 8th day and small flannelette bandages applied. He was allowed up on crutches on the 10th day and started normal walking at the end of three weeks.



Figs. 1 and 2.—Widened lateral joint space, indicated by arrows. Figs. 3 and 4.—Normal joint spacing two months later.



Left Right
Fig. 5.—Discoid external cartilages.

August 5, 1945.—Discharged from hospital and told

to avoid rough ground and stairways.

August 17, 1945.—Reported to the out-patient department. There was full range of movement in both knees, but a little fluid was present in the right knee. The former complaint of pain was gone. His gait was better and he could toe in without discomfort. x-rays showed a return of normal joint spacing (Figs.

Right cartilage measured 4.0 cm. x 2.5 cm. x 1.0 cm. It was definitely thickest at the central anterior third and generally irregular over its upper surface, roughly triangular in shape.

Left cartilage measured 3.5 cm, x 2.5 cm, x 0.7 cm. It was similar in shape and appearance with the thickest area anteriorly. There was a definite medial concavity as if a real attempt had been made in its development (Fig. 5).

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Medical Arts Building.

RECONSTRUCTION OF THE COMMON BILE DUCT WITH A MONEL METAL TUBE

By J. D. McInnes, M.D.

· Sudbury, Ont.

Mrs. A., a white woman of Finnish extraction, 43 years of age, came to the office in July, 1945, complaining of pain in the upper right quadrant, associated with belching and occasional vomit-This triad of events had been occurring periodically for the past six months. She had never been jaundiced. Physical examination was negative except for pain at the height of inspiration while exerting moderate pressure at the border of the ninth costal cartilage. Cholecystograms revealed a non-functioning gall bladder with lithiasis. She was admitted to hospital and a cholecystectomy was performed. The gall bladder contained numerous soft yellow facetted stones and the wall was slightly fibrous. Postoperatively the course was uneventful except for moderate drainage of bile from the area of the wound where a soft rubber subcutaneous drain had been inserted. This drainage ceased in two weeks' time.

The patient was seen a few times after discharge from hospital and each time had no complaints. She was not seen again until December 27, 1945, when she reported because of an itchy skin and jaundice. She stated that the jaundice came on slowly over four or five days. She did not complain of pain. The urine at this time was very dark and contained a 4+ bilirubin with a faint trace of urobilinogen. The icteric index was 75 and the stools were clay coloured. She was admitted to hospital and put on a high protein high carbohydrate diet along with vitamin K parenterally.

The abdominal incision revealed a cheloid growth throughout its length 1/4" high and 1/8" wide. In one week's time the patient was again operated on as it was feared a stone in the common duct must have been missed and that this had become impacted. Dense adhesions had to be separated down to the hepato-duodenal ligament and its vital structures were isolated with difficulty. The lower end of the common duct for a distance of $2\frac{1}{2}$ " was a solid fibrous cord, and attempts to pass a ureteral basket fitted with a plastic filiform tip were futile. The upper end of the common duct was flushed with saline and a catheter was inserted, the wound was then closed. After three days a heavy flow



Fig. 1.—The monel metal tube is seen in proper position. A gas shadow is seen extending up through the liver and is believed to be gas in the hepatic duct system—the gas from the stomach passing up through the monel tube.

of bile exuded from the catheter. In two weeks' time the jaundice had faded and the patient was considered ready for a reconstruction operation.

From the time of her second operation numerous attempts were made to obtain a vitallium tube from supply houses but these, at that time, were not available. Because of the apparent resistance of monel metal, it was thought that on the spur of necessity this might be used. local machine shop was given the specifications and they produced a tube 1½" long and 4 mm. outside diameter with a flange of 1 mm. on both

ends. At the third operation this tube was fastened by a purse-string suture of braided silk into the upper end of the duct and the lower end was inserted into the superior border of the pyloric end of the stomach and held in place by a further purse-string suture of braided silk. The patient was kept on parenteral feedings for one week and then oral feeding commenced. The stools became brown in colour and the residual jaundice abated. In the second week postoperatively a bile-stained fæcal-like discharge exuded from a draining sinus in the wound; this became progressively less and eventually disappeared.

Radiographs taken three and one-half weeks following operation revealed the tube in excellent position and there appeared to be no evidence of erosion. A gas shadow was seen extending up through the liver and was thought to be gas from the stomach passing up through the tube and into the biliary system.

The patient is now clinically well and is passing well formed stools containing normal amounts of bile. It is intended that radiographs be taken at three-month intervals over a period of years to determine whether or not electrolysis is occurring. Monel metal is a nickel copper alloy known to possess remarkable resistant properties, it is hoped that it will remain inert in body tissues.

An x-ray taken in the middle of April showed the tube to be still in place, with no evidence of irritation.

BRONCHIAL STENOSIS AND ATELECTASIS FROM SULPHUR DIOXIDE

By W. A. Murray, M.D.*

Montreal

All irritating gases have, according to Haggard, the same toxicological action on the respiratory tract. The differences in symptomatology, noted in individual cases, are governed by their site of action and are dependent on the relative solubility of the gases.

Sulphur dioxide is a highly irritating gas. Sulphurous acid is produced by contact of this gas with the moisture of the respiratory tract. It, in turn, rapidly oxidizes to sulphuric acid. Sulphur dioxide is found when sulphur is burned or oxidized. It is a by-product of the smelting and refining of sulphite ores. It is used

refrigerant in refrigeration machines. It is an occupational hazard to numerous workers.

Sulphur dioxide fumes are so irritating that chronic sulphur dioxide poisoning does not on

as a disinfectant, a bleaching substance and a

Sulphur dioxide fumes are so irritating that chronic sulphur dioxide poisoning does not occur, inasmuch as a worker cannot remain in an atmosphere containing more than a small percentage of the gas for any length of time. Acute poisoning occurs when there is a sudden escape of gas from a leaking or broken container, the most common being a leak in a refrigeration apparatus.

McCord² noted that sulphur dioxide was a most suitable refrigerant but came at the top of the list as a respiratory irritant. The main effect of the gas is on the upper respiratory tract but it may also cause lesions of the bronchi and lungs. Persons exposed to mild concentrations of the gas complain of headache, cough, bronchitis, constriction of the chest and gastrointestinal disorders. However, asphyxia from acute catarrhal bronchitis, pulmonary ædema and even death may occur.

Joseph Gordon³ reported a case of acute tracheobronchitis complicated by bronchial stenosis, following the inhalation of sulphur dioxide gas. The case which is to be reported here is similar to Gordon's case, though in the early stages it was suspected of being a case of pulmonary tuberculosis.

The patient, a man aged 40, in the performance of his duties servicing refrigeration equipment frequently had to deal with sulphur dioxide leaks. He consulted me first in 1941 for pain in his left chest and cough, and for impaired hearing. These symptoms came on while he was suffering from an upper respiratory infection and immediately following exposure to sulphur dioxide gas.

About five years previously he had had an attack of severe pain in his left chest, after having been called out to work on a sulphur dioxide leak. At the time he was at home suffering from a cold and went to the job without the protection of his mask. His physician found signs of pleurisy at the base of the left lung. He had fever and cough with some expectoration. Five or six specimens of sputum were examined at that time for acid-fast bacilli and were reported negative. This illness prevented him from working for approximately two months. After working for about six weeks he had a recurrence of his pain and cough which lasted for another two weeks. X-rays taken at that time showed a shadow in the lower left lung field.

In 1940 he joined the reserve army and went to camp for two successive summers. It was shortly after returning from camp in 1941 that he consulted me for the pain in his lower left chest with cough and expectoration. He had repaired a sulphur dioxide leak a few days previously. He was put to bed, where he remained for several weeks. His temperature ranged as high as 104°. Examination showed a definite reddening of the throat. His ear drums were quite retracted. His heart and blood pressure were normal. His chest showed an impairment of percus-

^{*}From the Department of Medicine, Montreal General Hospital.

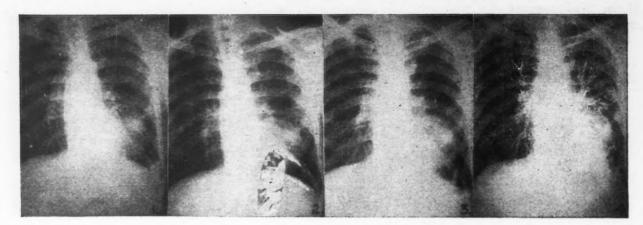


Fig. 1. (August 27, 1941).—Abnormal shadow in left lung field and signs of thickened pleura.

Fig. 2. (August 6, 1942).—Shadow in left lung field persists. Signs of pleural thickening improved.

Fig. 3. (September 16, 1943).—Abnormal shadow in left lung field essentially unchanged, but signs of air and fluid in left pleural space.

sion note, with moist râles and rhonchi over the whole lower left chest in the axillary region. X-rays taken following this attack showed a shadow in the left lung field at the level of the apex of the heart and continuous with the heart shadow, with thickening of the pleura in the left costo-phrenic angle and along the lateral portion of the chest wall to the level of the fourth rib anteriorly (Fig. 1). Sulfonamide therapy was tried without benefit. He was away from work this time for a period of seven weeks. Cough with expectoration persisted after this attack.

He was reasonably well all the winter of 1941-42. X-rays taken in August, 1942, showed that the thickening of the pleura had disappeared but that the shadow in the left lung field remained unchanged (Fig. 2).

In September, 1943, he was again exposed to sulphur dioxide gas. Within a couple of days he began to cough more and his sputum increased. He developed pain in his left chest. This attack was much less severe. However, x-rays now showed evidence of air and fluid in the lower left pleural space and a slight collapse of the left lower lobe. In comparison with previous x-rays the dense shadow in the lung field had remained unchanged (Fig. 3).

The facilities of the Royal Edward Laurentian Hospital were then called upon to investigate the case more fully. Dr. Burke, in his examination, noted slightly impaired movement of the left leaf of the diaphragm and some fleeting rhonchi, which were both audible and palpable, over the lower portion of the left half of the chest anteriorly. A Mantoux test (1:100) gave a positive reaction. His sputum was negative for acid-fast bacilli both on direct smear and on concentration. Cultures for acid-fast bacilli were negative.

A review of these findings, in the light of Dr. Joseph Gordon's observations, suggested to us that our man's sulphur dioxide experience might explain the picture on the basis of a partial stenosis of the main bronchus to the left lower lobe with associated atelectasis and pneumonitis. Dr. Hodge saw the patient and bronchoscoped him. He reported some reddening and thickening of the mucous membrane of the lower part of the trachea and of both main bronchi. Apart from this, the right main bronchus appeared normal. The left main bronchus seemed slightly pulled to the

left side and upwards. No definite stenosis could be

made out on direct bronchoscopy.

Lipiodol was then introduced into the various bronchi of the left lung and x-ray pictures were taken. These pictures showed that the bronchi of the lower lobe were essentially normal. They disclosed, however, a lack of filling of the pectoral branch bronchus of the left upper lobe. Re-examination of the patient's previous x-ray pictures, in the light of this finding, showed that the dense shadow in the lung field was in the area supplied by this bronchus (Fig. 4).

Following the lipiodol studies Dr. Hodge attempted to dilate the pectoral branch bronchus of the left upper lobe. The patient states that he has felt very much better and has been able to work steadily ever since. He has had no recurrence of his chest pain, his cough has greatly improved and his rhonchi have disappeared. However a recent x-ray shows that the abnormal shadow, previously noted in the left lung field, is still present.

The factor which has, in my opinion, contributed most to our patient's sense of wellbeing, is that since he has been told of the cause of his trouble he has been much more careful to avoid exposure to the fumes of sulphur dioxide.

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"We must not accept any speculations merely because they may appear pleasant, flattering or ennobling to us. The sufferings of the world are due to this, that we despise those plain earthly teachers, reason, work and discipline. "-Sir Ronald Ross.

Fig. 4. (February 12, 1944).—Lipiodol study showing lack of filling of the pectoral branch bronchus of left upper lobe.

SPECIAL ARTICLE

THE WIDENING HORIZON IN CANCER EDUCATION AND TREATMENT IN ONTARIO

By L. J. Crozier, M.D.

Superintendent, Victoria Hospital, London, Ont.

New impetus and new hope of success in the war against cancer was given in 1934 when the Provincial Government of Ontario set up seven Institutes of Radiotherapy—in Toronto, London, Kingston, Windsor, Hamilton and two in Ottawa. These Institutes are the result of an exhaustive study and recommendation by the Royal Commission in the Use of Radium and X-rays in the Treatment of the Sick, following several months' investigation in Canada, the United States, Great Britain and the continent.

In 1943, with the organization of the Ontario Cancer Treatment and Research Foundation, a great stimulus was given cancer work in this Province. The Foundation, with Mr. Arthur Ford as Chairman, co-ordinates the already existing facilities, and, as a result, offers a more complete unit for the radiotherapy management of cancer, encourages an adequate follow-up system of the cancer patient, and emphasizes clinical research. Following this approach to the cancer problem in this Province, the seven cancer clinics as well as others have made a splendid contribution to the education of the public in the value of early diagnosis and secondly in the treatment of the actual cases. For example, in the clinic at Victoria Hospital, London, there were 99 cases in the year 1936; in the year 1945 there were 864 new cases treated. The Director of the Clinic, Dr. Ivan Smith, in his report for 1945 states, "It is gratifying to see the increasing numbers of early lesions'

The whole picture to date represents only an initial attempt in the conquest in cancer. It is estimated that nearly 200,000 citizens of Canada and the United States will die of cancer during 1946. Real tragedy lies in the fact that at least one-third of these cancer deaths will occur because the patients themselves fail to recognize the early signs and symptoms of this disease. They did not seek medical advice in time for successful treatment.

In sharp contrast and most encouraging are the patients who recognized the dangers early and with the help of their family physician were given the full benefits, both surgical and radiotherapeutic, and as a result continue to enjoy good health.

In Canada, as well as in the United States, the month of April was designated as cancer control month. The \$2,000,000 being raised in

the current cancer campaign in Ontario, which coincides with a cancer campaign throughout Canada and the United States, is for the three-fold purpose of public education, research, and better cancer treatment facilities.

Through a system of lectures, written articles, moving pictures, radio talks and the press the public are to be informed that cancer may be cured in the majority of cases when the diagnosis is made early and expert treatment given. Education must always be an important factor in controlling cancer. Although many hospitals have been fortunate in having modern clinical facilities to fight cancer since 1934 yet only a small percentage of the citizens know that such facilities exist. An educational program should also emphasize facilities and where they are located.

Better and more extensive treatment facilities are needed if cancer is to be brought under control. In this respect the authorities planning such a program must avoid unnecessary duplication of services, which is not only wasteful of economic resources but also of professional time and effort. In this respect, also, we need more interrelationship between hospitals in a given While we have excellent hospitals both large and small we lack working relationships with one another. Small hospitals in rural communities have incomplete diagnostic and therapeutic facilities while, on the other hand, in our large urban centres, there is much overlapping and unnecessary duplication of services. Cancer facilities must be established with regard to community needs and the area to be served. Herein lies a challenge to the Ontario Cancer Foundation to develop a service in this Province that will be adequate and available to all the people.

To effect further progress in cancer control and to improve existing facilities we could obtain valuable lessons in organization from the present care of patients suffering from tuberculosis. Here adequate clinical facilities are numerous with large sanatoria located at strategic centres throughout the province. As cancer is a noncontagious disease, cancer units and cancer hospitals should be closely affiliated with general hospitals to avoid duplication of already existing facilities. A greater emphasis must be placed on the part that the family physician has He sees the patient first and it is through his alertness that patients may have the benefit of early diagnosis and treatment. There is no use in a physician telling his patient to act promptly in obtaining accurate diagnosis if there is not ample opportunity for him to do so. There is no point in emphasizing the correct treatment unless there are chances to obtain it. We must see to it that the opportunities for early diagnosis and successful treatment are available to both physician and patient.

In addition to the Cancer Clinics in the many centres there should be a division of cancer research as well as diagnostic and treatment facilities in the medical school centres interested in the cancer field. Cancer research at the present time is very small. Only a very small amount of money in comparison with the number of cancer cases is spent for investigation in this field and yet cancer is regarded as the greatest problem confronting medical research today. Any attack on such a problem must be a relatively long-term one. It will require the highest standards of scientific talent supported by adequate facilities as well as finances.

Finally there is need in several of the large centres for the cancer clinic unit which will provide bed accommodation. In such a unit there would have to be the co-ordination of the other departments, and in this co-ordination the whole medical staff of the hospital would be most essential if the complete cancer unit is to fulfil its proper function and meet the needs of all the citizens. At Victoria Hospital, London, like all general hospitals throughout the Province, present facilities and space for treating cancer patients is inadequate and at the same time treatment in many cases has to be deferred as there are no available beds. Serious thought is now being given to the present and future trends in cancer treatment. A unit providing adequate bed accommodation for 100 patients has already been proposed by our medical advisory board.

Besides the present clinics and the provision for new ones, it is possible that complete cancer hospitals or units providing diagnostic and treatment facilities and bed accommodation and closely associated with general hospitals will be established in several areas in Ontario during the next five years.

We are entering a new era in the fight against cancer. To be successful it will call for unselfish leadership, the co-operation of the whole medical profession and the interest and financial support of our citizens.

In language the whole intellectual and moral essence of a man is to some extent revealed. "Speak, and you are" is rightly said by the Oriental. The language of the natural man is savage and rude; that of the cultured man is elegant and polished. As the Greek was subtle in thought and sensuously refined in feeling—as the Roman was serious and practical rather than speculative—as the Frenchman is popular and sociable—as the Briton is profound and the German philosophic—so are also the language of each of these nations.—D. Jenisch.

CLINICAL and LABORATORY NOTES

AN INSTRUMENT FOR CONTINUOUS PENICILLIN THERAPY

By Surgeon Lieutenant Commander H. D. Hebb, R.C.N.V.R.

Toronto

Since penicillin has been introduced into clinical use, various methods of systemic administration have been devised. At first, the intravenous route was used by injecting various doses at regular intervals or by continuous drip. These methods are still recommended by some clinicians especially when high concentrations of penicillin are required in the blood. The main disadvantage associated with intravenous use is the frequency with which thrombophlebitis is encountered.

Later, the intramuscular route became the method of choice. It soon became known that sufficiently high concentrations of penicillin could be obtained in the blood, and that clinically, the results were as satisfactory as by the intravenous route. Intermittent intramuscular injection is still the favoured method in many large medical centres today. main disadvantage associated with this method of administration is the discomfort of the patient, which usually increases in direct proportion to the duration of treatment. Sleep is disturbed and "needle-phobia" frequently occurs. To overcome this disadvantage, the continuous intramuscular drip by gravity has won favour in many medical centres. This method however, has two main disadvantages, namely (1) waterlogging of the tissues when large quantities of fluid are used; (2) difficulty in controlling and regulating accurately the rate of flow of the solution administered.

Recently, some interesting reports have appeared in American journals describing the use of penicillin in a bees-wax and peanut-oil mixture. By this method, using relatively large doses of penicillin (300,000 units), one injection will result in detectable levels of penicillin in the blood for as long as twenty-eight hours. The levels, however, taken at intervals throughout the twenty-eight hour period have been shown to be very erratic. Even during the first twelve hours, in some instances, no penicillin could be detected in the blood.

Associated with all these methods of administration, except the last, the required nursing care is considerable. In addition, some methods require bed rest for an otherwise ambulant patient.

The instrument to be described was devised to overcome all the disadvantages so far noted.

DESCRIPTION

A 5 c.c. syringe containing a 24 hr. dose of penicillin is emptied at a regular rate by the controlled force of a clock mechanism.

To the central pin of a clock is attached a long screw on which rides a nut. As the clock turns the screw, the nut proceeds along the screw at a regular rate. To the nut is attached a clasp which holds the head of the plunger of the syringe. In this manner, the plunger is driven into the barrel of the syringe at a regular rate covering a 24 hr. period. The clock and syringe are contained in an aluminum case 7 inches long and 3 inches wide. The instrument, excluding the syringe, weighs 11 ounces, and is designed to be strapped on to a limb by means of adhesive tape. The underside is concave to fit comfortably on to the convex surface of the limb. The fluid passes from the syringe through a small stainless steel cylinder into a small piece of rubbertubing which is attached to a 21 gauge 2 cm. needle. The tubing is outside the case and permits the needle to rest easily in the muscle undisturbed by any movement of the instrument.

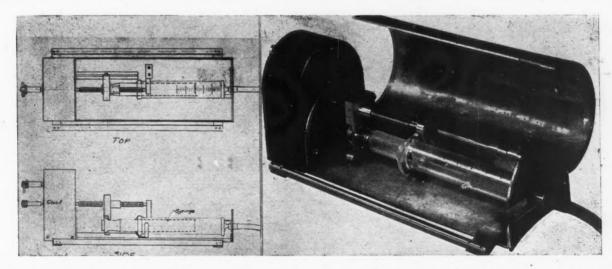
MANAGEMENT

After strapping the instrument to the thigh by means of adhesive, the needle, to which the stainless steel cylinder and rubber-tubing are attached, is inserted into the thigh. The nut is placed in the

needle. In one patient, the needle was not disturbed from its original position for ten days. Nursing care was therefore reduced to a minimum.

Penicillin is highly soluble. As much as 100,000 units can be dissolved in 1 c.c. of distilled water, or saline. One product of penicillin, however, contained small particles which failed to dissolve. These particles were found to block the needle causing sufficient pressure to stop the clock mechanism. In order, therefore, to obtain maximum efficiency, care must be taken to use products of penicillin which can be completely dissolved. In no case did the needle become blocked by blood clot.

The usual daily dose was 200,000 units. For the first day of treatment, this amount was dissolved in 7 c.c. of normal saline. About 1 c.c. of this solution was used to fill the cylinder, rubber-tubing, and needle. Then 1 c.c. was injected into the muscle in order to obtain a rapid rise in concentration of penicillin in the blood. The remaining 5 c.c. were



starting position and the clock wound up. The syringe, containing the required daily dose, is connected to the cylinder, and then inserted into the instrument. The hood is closed over the syringe and the treatment is begun. To continue treatment at the end of 24 hours, the clock is re-wound, the nut is returned to its starting position by turning the shaft as one sets the hands of a clock and the new syringe inserted. Only the needle, rubber-tubing, cylinder, and syringe need to be sterilized. It is advisable to coat the plunger of the syringe with a thin layer of vaseline so that worn syringes will not leak.

CLINICAL EXPERIENCE

Although this instrument was devised in December, 1944, it was not possible to begin clinical trials until April, 1945. Since then, it has been in almost constant use, not only on bed-patients but occasionally on ambulant ones. In every case, the patient stated that there was less discomfort than when other methods of administration had been used. There were no infections at the site of the

then allowed to run into the muscle of the patient in the manner already described. On the second and subsequent days of treatment, the daily dose was dissolved in 5 c.c.

Laboratory findings.—The following test was carried out: 200,000 units of penicillin were dissolved in 6.0 c.c. normal saline. Only 5.4 c.c. were recovered from the ampoule. The cylinder, rubber-tubing and needle contained 0.6 c.c. The remaining 4.8 c.c. solution containing 160,000 units were left for the estimation of blood concentrations. 0.5 c.c. was injected into the muscle at the beginning of the test. The syringe was then inserted into the instrument. At the 2nd, 4th, 6th, 14th, and 20th hour, readings were made to determine the rate of flow, and at the same time, 5 c.c. of blood were withdrawn from the patient. The following are the results obtained:

Time			Readings in $c.c.$										Blood levels in units per c.c. serun							
0915	(beg	an)	_				4.3												0.00
1115								3.9												0.16
1315								3.5												0.16
1515								3.1												0.14
2315								1.3												0.16
0530								0.0												0.16

Other uses.—Although this instrument was designed for use in penicillin therapy, it is possible that other uses, e.g., heparin therapy, continuous sedation, and experimental work in physiology and chemistry, may be found.*

The instrument was made by the instrument-making class at Dalhousie University, Halifax, N.S. under the supervision of Mr. McKeough.

The blood-level estimations were obtained through the co-operation of Dr. P. Greey, Department of Bacteriology, University of Toronto.

VENEREAL DISEASE CAMPAIGN



Functions of Federal and Provincial Venereal Disease Control Divisions

I. DEPARTMENT OF NATIONAL HEALTH AND WELFARE

The rôle of the Federal Division of Venereal Disease Control is to give leadership in reducing the menace of venereal infections in Canada:

- (a) By planning, in consultation with the provinces, adequate control measures on a comprehensive, effective basis;
- (b) To assist in the implementation and carrying out of the plans for the annual provision and distribution of federal grants;
- (c) To perform the functions of co-ordination, integration, standardization, survey and appraisal, and general exchange of ideas by consultation and conferences with the provinces and national agencies and groups;
- (d) To assist in the provision of lay and professional information services; and

(e) To encourage research and improve training facilities for professional personnel.

II. PROVINCIAL DEPARTMENTS OF HEALTH

All Provincial Divisions of Venereal Disease Control offer the same general type of service with slight modification to suit local conditions. These services may be briefly described as follows:

- (a) Collection of statistics on the incidence of venereal disease;
- (b) Provision of laboratory facilities for the diagnosis of venereal disease;
- (c) Maintenance of provincial clinics for the free treatment and diagnosis of venereal disease;
- (d) Distribution of medication to physicians for the treatment of their patients;
- (e) Epidemiological investigation by social service workers of persons who are named as contacts to cases of venereal disease;
- (f) Case-finding of venereal disease through blood test and medical examination of special groups such as prostitutes;
- (g) Application of "Venereal Disease Control Act" in cases where patients with venereal disease in a communicable form refuse to take treatment;
- (h) Education of the population on venereal disease.

"Find V.D. Contacts - Report V.D. Cases"

"Medicine, sometimes impertinently, often ignorantly, often carelessly, called 'allopathy', appropriates everything from every source that can be of the slightest use to anybody who is ailing in any way, or like to be ailing from any cause. It learned from a monk how to use antimony, from a Jesuit how to cure agues, from a friar how to cut for stone, from a soldier how to treat gout, from a sailor how to keep off scurvy, from a postmaster how to sound the Eustachian tube, from a dairy-maid how to prevent smallpox, and from an old market-woman how to catch the itch-insect. It borrowed acupuncture and the moxa from the Japanese heathen, and was taught the use of lobelia by the American savage. It stands ready today to accept anything from any theorist, from any empiric who can make out a good case for his discovery or his remedy. 'Science' is one of its benefactors, but only one, out of many."-Oliver Wendell Holmes.

^{*}Since this instrument was designed, a somewhat similar instrument driven by an electric motor has been described by Dr. C. E. Last in the *British Medical Journal*, January 27, 1945. This British instrument, however, is a table model which is not suitable for the ambulant patient.

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EDITORIAL

ARTIFICIAL RESPIRATION

HERE is still no agreement as to the most efficient method of artificial respi-The war and the consequent general interest in first aid have, however, served to emphasize the differences in opinion and to stimulate closer examination of the various forms of resuscitation. At present the two most widely taught first aid methods of artificial respiration are those of Schafer and Silvester, the former being probably the most commonly used because of its simplicity and ease of practice. But early in the war the Eve rocking method came to the fore, and this appears to produce better results than either of the two or indeed any other first aid measure. This method is the only one to make full use of the force of gravity. The tilting of the body downwards and upwards produces alternate elevation and lowering of the diaphragm by the thrust and withdrawal of the abdominal organs; it directly increases the circulation of the blood, and it drains off fluid from the upper respiratory tract. The criticism always made by Dr. Eve of the Schafer method is that whilst the diaphragm may be well pushed up by pressure on the lower ribs, it may not always have enough tone to descend when the pressure is removed; at the same time there is very little direct impulse given to the circulation. Eve's contention is supported by investigations which show that of the two the prone pressure method produces much less ventilation of the lungs, particularly in the deeply asphyxiated, toneless patients, who need it most. Eve's own experiments have shown that so far as the effect on the circulation is concerned the rocking method very soon will produce warmth in a chilled patient, whilst the Schafer method in itself will not. Incidentally, the Silvester method also produces greater ventilation than the Schafer.

The Schafer method possesses one cardinal virtue: it is simple and can be applied im-

mediately. Those are prime necessities in anything which is to be taught to all sorts and conditions of men, for the handling of an emergency in which time, even seconds, is so terribly precious. On the other hand, the Eve method calls for some kind of apparatus and that may mean a fatal delay. For this reason the Schafer method still holds its place. Dr. Eve however has published a short popularized account of his method which is very convincing.* The variety and ingenuity of the devices described are of great interest. The book though written for the layman may be read with profit by medical men, especially those who have not had the advantage of training in first aid. Dr. Eve describes modifications which go far to answer the objections made. A child for instance can be quite easily held in the arms and rocked until some kind of board or apparatus is ready; or he can be slung astride so that the head hangs down in front and the legs project behind. Even adults can be rocked without apparatus by men trained to do it. There might even be circumstances in hospitals when the rocking method could tide a patient over a period calling for prolonged artificial respiration.

The Schafer method will probably hold its place for a long time, but the Eve variation should certainly be taught as well. It may not always be practicable to start rocking the patient immediately but it should replace prone pressure at the earliest possible moment.

EDITORIAL COMMENTS

The Expanding Field of Physical Medicine†

"... the first primitive man who crawled into the sunshine to receive the benefit of its warmth and vitalizing effect unwittingly started the practice of heliotherapy; the first man who bathed a wound in some woodland stream unknowingly instituted the practice of hydrotherapy; and the first man who rubbed a bruised muscle unconsciously introduced massage."—F. H. Krusen.

Under the above heading Dr. F. H. Krusen of the Mayo Clinic recently drew attention to the increasing opportunities for the use of physical agents in both diagnosis and treatment,

^{*} Artificial Respiration Explained: Frank C. Eve, M.D., F.R.C.P.(Lond.), E. & S. Livingstone, Edinburgh, 90c.

f Proc. Staff Meet. Mayo Clinic, 20: 497, 1945.

laying stress on the use of the term physical medicine, rather than physical therapy, as the more appropriate designation for this phase of medical specialization.

The three major fields into which physical medicine is progressing indicates the broadness of its scope: physical therapy and the employment of physical agents in diagnosis; occupational therapy; reconditioning and rehabilitation of the convalescent patient.

Great impetus has been given to the eminently beneficial co-ordination of these three aspects in the rehabilitation programs of service hospitals. Under service conditions it is neither feasible nor desirable to cease formal medical care at the usual civilian point when a patient remains at home to recuperate before returning to work. A graduated program of reconditioning was found necessary. Such schemes of rehabilitation have necessarily been expanded to cope with the increased numbers of disabled veterans whose rehabilitation will be a prolonged experience.

Dr. Krusen notes the tremendous strides made in biophysics and stresses the need for physicians to be aware of these advances in electronics and electrical instrumentation that full use may be made of them for medical purposes. As examples he mentions the electron microscope, new types of cathode-ray oscillographs, the improved hearing aids, the possibilities for quick sterilization of surgical instruments with high frequency coils, the advances in methods of roentgen-ray and electron diffraction in the determination of protein molecular structure.

As a result of its extensive survey of the present facilities and the future possibilities of physical medicine, the Baruch Committee, on completion of its report in 1944, has disbursed considerable sums of money to various American medical centres to provide facilities for the development of physical medicine. The largest of these grants, \$400,000, was to the Columbia University Collège of Physicians and Surgeons "to establish a model centre for basic research and teaching of physical medicine".

In view of such rapidly increasing opportunities Dr. Krusen has good reason to state that "the future of physical medicine looks exceedingly bright".

MEDICAL ECONOMICS

THE DEVELOPMENT OF ASSOCIATED MEDICAL SERVICES INC.*

By J. A. Hannah, B.A., M.D., C.M.

Toronto

The development of Associated Medical Services arose from the desire on the part of the individual to secure adequate modern medical facilities without losing economic security. It is not to be presumed that A.M.S. is the only attempt to solve this problem. Simultaneously, in 1937, there sprang up Windsor Medical Services and The Hollinger Employees' Medical Services. Since that time other similar organizations have been organized in Regina, Winnipeg, and Vancouver. Governments too have responded to the pressure of public demand. The Dominion is purposing legislation and several Provincial Governments actually have legislation on their books, none of which has passed beyond the theoretical and paper

Thinking in regard to this problem is still very immature. Very little practical experience has been gained. Up to the present, because of eight and one-half years' actual operation, A.M.S. appears to have gained more practical knowledge in this field than any other organization of its type in Canada. While it is a matter for admiration (and on occasion jealousy) that A.M.S. has been able to remain in a state of expanding solvency, there has also been a tendency to express impatience at our apparently slow growth and expansion. This very factor of "creeping before we walk" has been the basis of our continued solvency.

RELATIONSHIP OF GROWTH TO SOLVENCY IN ASSOCIATED MEDICAL SERVICES

As Managing Director of A.M.S. since the outset, I wish to point out in no uncertain terms that the most important lesson which this experience has taught us is that the moment we succumb to the pressure for growth at a rate too fast for our practical knowledge, we will find ourselves headed for the scrap heap of insolvency along with scores of others who have made the power of large numbers their god. This is because it is axiomatic that the welfare of the whole must always supersede the needs and desires of the individual. It is a slow and painful process to educate the individual, through experience, to realize that he must retain a certain minimum personal responsibility if he would have personal liberty.

It is impatience with humanity's slowly mov-

[&]quot;Among the circumstances which cause the hearts of the people to turn away from the reputable physician is the delusion that the medical man should know everything and ask no questions. If he inspects the urine, or feels the pulse, he is supposed to know what the patient has eaten and what he has been doing. I myself, when I began to practise medicine, had resolved to ask no questions when the urine had been given me, and had been much honoured. Later, when it was seen that I had made circumstantial enquiries, my reputation sank."—Rhazes.

^{*} From the ninth annual report of the Managing Director of Associated Medical Services to the annual meeting January 28, 1946.

ing mentality which drives the general public to put pressure on our Governments for This urgency has security at any price. caused all studies we have seen so far to miss entirely the basic problems involved. have sought to take the "short-cut" to mass "social security" at the expense of "personal liberty". As history has shown, there is no security of any kind in this direction. Unfortunately, the various bodies intimately associated with the problem have fallen into the same error. They fail to realize that their proposals endanger the very elements which they as individuals hold essential and basic to their own and their profession's welfare. Indeed, there have been times when it appeared that these bodies (including the public and the medical profession) have felt that as a group they could, with impunity, usurp the rights of others to their own advantage. At best, it appears to be a setting of one interest against another. Robbing Peter to pay Paul has never proved sound policy.

Of the numerous governmental reports which have appeared it is enough to say that basically they have all concerned themselves primarily with the question: "How can the rights, prerogatives and desires of each group, under presently existing circumstances, be so readjusted as to give advantage to the most impor-tant and influential group?" At first glance, it would appear that each group making a presentation has tried to outsmart everyone else. Under these circumstances, the politician finds scope for a real field day. Let me hasten to say that we do recognize a great deal of sincerity in all these reports and presentations. We attribute the errors committed to ignorance of past history, a basic lack of appreciation of the problems involved, and an inherent desire to mark time by supplanting practical experience by theories. Anticipation through theory is always much more exhilarating than the routine of practical experience.

As regards the A.M.S. we are content with a rate of progress and growth which has accumulated some \$360,000 reserve on 35,000 subscribers in eight and one-half years. Further, we accept as an expression of satisfaction on the part of our public the fact that we still have more than 70% of our original 2,000 subscribers after the expiration of eight and one-half years. All this has been accomplished despite the fact that six of our eight and one-half years have been spent during the difficult and trying time of war.

A.M.S. and experienced personnel.—As A.M.S. has grown from zero to close to 35,000 subscribers, our staff has grown accordingly. When we opened our office at 11 Queen's Park on June 1, 1937, there was a staff of one stenographer and myself. Today, we have a staff of 61 in head office and the branches. The process of training this staff to the point where they are fully responsible has been a heavy task in itself.

I am sure that key members of our present staff will be the first to attest to the difficult experience of growing into full responsibility. I know they will be the first to admit with me that we still have much to learn in regard to the daily crop of new problems which arise. Our staff has never a dull moment.

Our experience indicates that unless any plan for health insurance, whether it be Dominion, Provincial or local, grows gradually and on the basis of experience, it is doomed to insolvency. In fact, our experience leads us to believe that health insurance is of such a nature that a complete coverage on a wide basis is economically unsound under existing circumstances. We do not mean to say that a start cannot be made. We do say, however, that on a Dominion or Provincial basis, until such time as we gain sufficient experience and can train personnel, it will be necessary to limit the coverage given to expense in respect of medical cost to cover the catastrophies above a minimum level of approximately \$25.00. Alternatively, a simplified and better organized method of providing medical care would make it possible to give complete service. So far nobody has tackled the problem from this angle. We will deal more extensively with the problem of extent of coverage and method of providing such service later in this

At the moment, we are concerned that we and everyone else shall realize how essential is the problem of securing sufficient personnel with the ability to grasp the extent of the responsibilities involved, and to be able to discharge them when once they are realized. We have found that the pool of ability is relatively small in relation to the problem and that even though available, it will require a long period of training.

Experience in relation to extent of service.—
As you are aware, A.M.S. started on a very broad basis, including everything from office and home calls to the most major operation, and such hospitalization as was necessary for the condition under treatment. Private duty nursing in the home as well as the hospital was also included. In 1942, we were forced to eliminate some of the services over which control was impossible. We also had to set definite limitations on certain conditions such as obstetrics. This adjustment checked the unfavourable economic trend attributable in large part to abuse or what is known in the vernacular as "chiselling".

It is still abundantly apparent that we have not yet reduced our services to an economical basis. During 1945, we spent \$123,000 on administration. Of this amount, on a very conservative estimate, we spent at least 50% or a total of \$61,000 to administer accounts of less than \$10.00. This amounts to approximately \$2.00 per subscriber per year for administration which is much more costly to the subscriber than if he paid directly. This, however, is not the worst feature. Despite our best efforts to control

abuses, your administration estimates that at least \$100,000 was spent in minor items which did no one any good insofar as their health is concerned. In all, your administration feels that an average of at least \$5.00 per subscriber per year is wastefully spent through abuse and an endeavour to control it. Despite continued solvency and increasing satisfaction on the part of our subscribers, your management recognizes that such wasteful expenditure is not economically sound and that our duty demands some solution for elimination of this waste.

To us it appears that we cannot change human nature. Insurance generally has known for a long time that the easier it is to reap benefits from insurance the greater will become the demand for benefits. In the vernacular, "insurance is fair game". When an individual deals with a common fund there appears to develop an "elasticity of conscience" which would be construed as dishonesty if dealing with another individual. It, therefore, appears necessary to find such a solution to the problem of health insurance that there will be a minimum of opportunity to exercise this elasticity of conscience.

Your administration has been aware of this problem for a long time. Our studies culminated in the institution of "Group Medical In it we believe we have the basis of establishing an economically sound service for the public. It is so simplified that it can be administered with much greater ease and less expense and can also eliminate abuses. In addition, it will eliminate the source of some 60 to 75% of criticism to which we are subject under A.M.S. The institution of this plan demanded consideration of the whole question of the application of the insurance principle to medical services and it would be well for us all to know something of the problems involved.

THE APPLICATION OF THE INSURANCE PRINCIPLE TO MEDICAL CARE ON THE BASIS OF EXPERIENCE IN A.M.S.

What is the insurance principle?—"It is the application of the law of averages to controllable risks". There has been no problem in my whole experience which is more complex and conducive to confusion than the application of the insurance principle to medical services. Moreover, it is the more confusing because at first glance it appears so simple. The element of human welfare involved gives rise to an expanding stimulation and an everexpanding exhilaration in anticipation. Actual experience, however, soon brings us up short in the realization that there are very definite limitations to what can be done. Improperly used, the insurance principle can, like abuse of charity, degrade and destroy both the giver and receiver of its benefits. It is difficult to retain sufficient degree of reality to make it practical. If these facts be doubted it is only

necessary to acquaint ourselves with the hundreds of plans which have started so auspiciously and have ended on the scrap heap of insolvency.

The first principle which must be observed is the fact that each economic class must be given as much, but not more economic assistance than is required for their basic needs. In our experience it is necessary to divide the population into two economic categories and consider each separately: (1) Those whose economic status is not above bare basic standards for existence, exclusive of illness. These people must remain a total responsibility on taxation. (2) Those above the subsistence economic level, or the middle classes. These people want to and can pay the total cost of a basically necessary service.

Perhaps, it might be well to consider a third class, viz., those with a desire for and whose income will support a luxury service. This class should not, however, be excluded from the privilege of providing against the cost of a basically necessary service in relation to the condition under treatment. They must, however, be made to realize that they can only have such benefits as are basically necessary. They must not be allowed to exercise their luxurious tastes at the expense of others.

The first error committed in any approach we have so far seen in Canada, lies in the fact that there is a tendency to regard such a division as discrimination, and derogatory to everyone. All Governmental studies have made this error. The net result on thinking is that all proposals base the amount of service necessary and the method of payment for that service on the level of the lowest income grouping. It does not necessarily follow that because it is necessary to sustain the indigent and low income groups through taxation this is the most economical or satisfactory method for all.

In Ontario and some other Provinces a very fair and satisfactory start has been made toward providing these low income groups with their needs for medical care. In time these should develop into a satisfactory service. It is, however, an error to presume that the same system can be applied to the middle and upper class groups. In our opinion, the latter two groups should be considered separately. The indigent and low income group have, in the past, been cared for largely by the medical profession. It has been generally admitted that such people have been better served than the middle classes who, unlike the upper income groups, cannot afford to purchase many of the essential, but very costly methods of investigation and treatment.

It would, therefore, appear that the first concern should be to remove the burden of the indigent from the shoulders of the profession and spread it over the whole population through taxation. It is no less important that some method of relieving the middle class of the catastrophic costs of severe illness be evolved and to devise some means of making it possible to bear the costs of expensive investigation without threat to their economic solvency. Herein lies the second confusing element. It has been wrongly presumed that to accomplish this end we must provide an absolutely complete service without changing our present system of practice. This is neither necessary nor compatible with the application of the insurance principle to the cost of illness. For the insurance principle to operate successfully there must be a minimum of human control from either administration or the subscriber.

Controls in the application of the insurance principle.—If we look back over the development of the application of the insurance principle, we will find that life insurance (which could be called death insurance) has been most successful. In it there is a bare minimum of human control possible. True, it is possible to reap benefits for our heirs through suicide, but death is so final and irreversible that few humans want to overcome the "will to live". In addition, the insuree is usually much more profitable to dependents if he remains alive. There is, therefore, a maximum desire to prevent claims maturing. Consequently, the administrators of such insurance fund find it comparatively easy to control abuses. The applica-tion of the insurance principle to hail and weather insurance also contains a minimum of human control over maturation of claims.

When we pass to the application of the insurance principle to risks in marine and fire insurance, we find more of human control possible and consequently the insurer must exercise safeguards to a greater extent than in life and weather insurance. Indeed, it has been found impossible to extend the privileges of insurance to certain classes of people and risks in this field.

When we pass into the field of so-called health insurance, the situation is almost completely reversed as compared with life insurance. The broader the coverage in health insurance the greater the human control in maturing claims. Not only can an illness be the cause of maturing claims in health insurance, but the claimant can always utilize the cry of prevention to substantiate the necessity for improper claims. Unfortunately, the claimants can and very frequently do secure the support of those rendering the service, and believe that when they have done so they have the support of the final authority. It is most difficult to administer health insurance and keep claims to a just basis in face of this almost overwhelming pressure.

So far we have dealt only with pressure to mature claims from the subscriber and his relatives as well as the physician. If now we consider Government plans and add to the previously mentioned sources of pressure a third—the political—with all its implications, there is

grave doubt in our minds that solvency will ever be possible under a service with complete coverage. Failure to recognize these facts has constituted the basis of one of our gravest errors in approaching this problem. Fortunately, there is a solution to these difficulties, although they will always be great. These difficulties can be sufficiently overcome in one of two ways in order

to make such a plan operable.

The first solution lies in recognizing that a complete service for those from the middle class upward (income of \$1,000 to \$1,500 and up) is not necessary to answer the needs and demands of the public. In a province like Ontario where, before the war, there was one pleasure car for every four individuals, the cost of minor illness does not constitute a hazard to economic solvency. The first \$25.00 of expense and the cost of the first two or three days' hospitalization in each fourteen-day period will constitute less of an economic hazard than the Christmas season or the advent of a wedding in the family circle. There is no demand from this income group that such economic hazard as Christmas or a wedding should become a responsibility of insurance through Government control. It is almost as foolish to demand this consideration in the matter of minor services. The institution of a plan to eliminate the major economic hazards of illness can be provided at less than half the cost of a complete coverage and will eliminate sufficient of the human controls that it will fall well within the field of practicability.

The second method by which the problem can be solved can best be brought about by the profession. Assistance and support of Government may well prove useful and necessary. however, a mistake on the part of both the profession and Governments to assume that control must be vested outside the profession itself. Indeed, it has been one of the greatest mistakes for both the Government and the profession to assume that the profession should, or must, be relieved of this responsibility. If the profession will undertake to improve the efficiency of their methods of rendering service and placing themselves on a salary ranging from \$5,000 to \$35,000 per year depending on qualifications and experience, which they themselves control, they can have security during both active practice and for their old age. While practising they can have (in over 85% of cases) from three to five nights a week free of professional inter-

ference. They can have a month's holiday each year with pay and without fear of losing their patients. In addition, they can have from two weeks to a month each year (with pay) to do postgraduate study and every seventh year can be sabbatical. All this they can have and the cost of medical care can be reduced by from 30 to 40% to the public.

We say these benefits can be had provided the profession is prepared to institute internal control and discipline. To date the profession has shown an extraordinary desire for control over health insurance. They have, however, avoided that internal control and discipline which the high calling and special privileges, which the profession enjoys, should demand. This control and discipline should be instituted immediately, irrespective of the advent of health insurance. There is evidence that the profession as a whole has lost a considerable degree of respect of both the public and governing bodies. Unless the profession can rise to its full responsibility and exercise more disciplinary control over itself than has been manifest in the past fifteen to twenty years, not only will they lose the opportunity to advance the cause of medical practice through health insurance, but the profession is in grave danger of marked degeneration.

These are strong and dangerous words in the face of constituted authority. We are, however, convinced that we speak the truth. We dare to express them in the hope that the profession will take appropriate action before it is too late.

THE FUTURE OF A.M.S. IN THE LIGHT OF OUR EXPERIENCE

For nearly nine years now A.M.S. has endeavoured to co-operate with the profession in bringing about a satisfactory solution to the economic difficulties with which we are beset. We have paid for doctors' services alone more than \$12,000 annually for each 1,000 subscribers. This means that the average income to doctors from A.M.S. subscribers has been more than double the best average revealed by any study so far made on this continent. The response from individual members of the profession has been reasonable, co-operative and satisfactory. The response from organized medicine has been a persistent demand for complete control with an equally persistent refusal to assume any responsibility for either solvency or disciplinary control of its own members. It would appear that the time has arrived when your Managing Director must advocate the development of our own plans without hinderance.

On the other hand, experience has taught us that we can expect reasonable assistance and co-operation from the vast majority of the profession. The advocacy of the institution of Group Medical Service was our first step in this direction. We have advocated other plans for advancement which we hope your Board will see fit to implement during 1946. The most important of these will be a free chest x-ray service for all our subscribers. All such plans are projected toward the end of taking A.M.S. out of the experimental stage and establishing it as a more useful and integral part of the social and economic life of the community.

In retrospect, the past eight and one-half years have been productive of: (1) A successful self-sustaining experiment in budgeting against the cost of medical care. (2) A staff

trained and capable of further development and the acquisition of an ever-increasing number of subscribers. (3) Education to the point of realizing that success is and will continue to be a steady but relatively slow growth attuned to our increasing ability and knowledge. (4) Increasing knowledge of the application of the insurance principle to the cost of illness. (5) Increasing co-operation from individual members of both the profession and the public.

On the basis of the experience gained, A.M.S. can look forward to increasing usefulness. The application of the knowledge gained will require unflinching courage, clear thinking and patient understanding to the end that all the numerous efforts to solve this problem may be united in a forward movement toward greater personal liberty through the assumption of personal responsibility in the field of medical economics. The contribution of any one individual or organization to the maintenance and development of democratic ideals may be comparatively small. It is, however, the sum total of accepting personal responsibility which makes democracy possible and workable.

MEN and BOOKS

MEDICAL EDUCATION IN THE 14th CENTURY*

By Heber C. Jamieson, M.D.

Edmonton

Why should one in the middle of the 20th century be interested in medical education in the 14th century? This is a question which puzzles the modern student, but should it? One cannot understand the present without a knowledge of the past and this fact justifies the study of the history of medicine, or any science, of art, in fact of every human endeavour and activity. The circumstance of this fact does not involve either a favourable or an unfavourable judgment on the achievements of past ages. It does, however, involve the need and duty of impartial weighing of these achievements.

In order to appreciate the state of medicine in the period under study one must have a clear understanding of the various trends of thought and practice of its leaders in medical education. To begin with it is important to remember Guy de Chauliac's assertion that the fundamental mistake of mediæval medical science was the divorce of medicine from surgery. It is generally agreed that the peak of mediæval medicine was attained at the close of the fourteenth century. If one reviews briefly the work of the

^{*} Read in Calgary at Associate Clinic in February, 1942.

two previous centuries sufficient orientation is

obtained for our purpose.

About 1200 A.D. two currents of thought were developing which flowed in separate and devious channels to gradually merge to form the more clearly defined stream which reached its height

about the year 1400.

One was controlled by the Church. "The church monopolized all scholastic activity and even dominated all thought. Aristotelian philosophy was drawn into the orbit of Christianity and became the centre around which revolved the doctrine of Thomas Aquinas, who became the spiritual leader of this tendency" (Castiglioni). This represented the inner branch of medicine.

The other stemmed from Sicily and Southern Italy. This was a mixture of Hippocratic and Arabian medicine developed at Salernum by lay physicians. Its force was felt at Bologna and later greatly influenced Montpellier, the first school in Western Europe. Surgery was fostered

and advanced by this branch.

Frederick II of Italy in 1224 passed stringent laws for the practice of medicine. A preliminary course of three years was followed by a five year period of more specialized study. Before a doctor could enter his profession he had to spend a year with an experienced practitioner and then present suitable testimonials. This was a purely lay education and since the church in 1139 forbade monks to practice medicine it was the lay physicians who struggled against the scholastic medicine and prepared the way for the growth of medical science of the Renaissance.

The outstanding advances were in the field of surgery and the chief of these was the principle of aseptic treatment of wounds, a procedure which was fast gaining recognition when a great surgeon Guy de Chauliac frowned on it and it remained forgotten until its reintroduction by Lister. Roger of Salerno in 1180 taught that the provocation of pus was the greatest possible error. Hugh of Lucca (1252) and his son Theodoric followed the lead of Roger and later Henri de Mondeville (1260-1320) carried this method to Paris where it received a cold reception.

Let us see how close this aseptic treatment of wounds comes to that of today. Mondeville removed all detritus from the wound with as little damage as possible, and irrigated with wine. The edges of the wound were then brought together by stitches. Cloths soaked in wine were applied closely on either side to keep the deeper parts in apposition. Over the wound another wine-soaked pad was placed and over all a bandage tightly applied and the dressing left undisturbed for days. It seems inconceivable that such a method should have fallen into disuse and that the theory of 'laudable pus' with the daily scraping of wounds and the use of tampons and vulnaries should have remained in surgery for so many centuries.

Another advance was the reintroduction of the knife which had been practically abolished by the Arabs. William of Saliceto (1210-1277) against great opposition advocated its use in preference to the cautery and it remained for Ambroise Paré to confirm its use.

When one views the middle ages in a spirit of impartiality one finds that the students of this period are divided into two classes. Singer, Professor of the History of Medicine at Oxford, representing one group, says of this period: "All theoretical knowledge was permitted to lapse. Anatomy and physiology perished. Prognosis was reduced to an absurd rule of thumb. Medicine deteriorated to a collection of formulæ punctuated by incantations: the life blood of the scientific stream was dried up at its source."

Others have called the 13th the greatest of all centuries, for it saw the foundation of the university, the signing of Magna Charta, and the origin of representative government in the west of Europe. It was the century of the Gothic cathedrals. In literature it gave us Dante, the shaping of the legends of King Arthur, the Romance of the Rose and Reynard the Fox, three books that had a universal appeal and were widely read for generations. The Meistersingers in Germany and the Troubadours of France were moulding the poetry of Europe. At the full flood of all this the 14th century dawned with a promise of intellectual and social advancement that was to be prematurely darkened by the Black Death in 1348 and 1349.

Let us see now if any reason can be found for the stagnation of all scientific, social and economic progress. Probably Roger Bacon can give us the answer. Summing up the doctrine he was teaching at the University of Oxford in the 13th century he started out with the principle that there were four grounds of human ignorance. These were: (1) There was inadequate authority. (2) The force of custom which leads man to accept too unquestioningly what has been accepted before this time. (3) The placing of confidence in the opinion of the inexperienced. (4) The hiding of one's own ignorance with the parade of a superficial wisdom.

A second reason can be attributed to the stifling of the spirits of the few survivors of the previous generations together with economic troubles at home and abroad consequent on long wars and the moral depression following the Black Death.

A survey of university and particularly medical education at this peak of mediæval progress presents many interesting problems. The founding of the university is unquestionably one of the most important factors, if not the most important in the development of modern culture. The university is distinctly a mediæval institution. Its ideals, its organization, offices, titles, ceremonies, costumes, and degrees have been carried down to modern times. The Uni-

versity of Bologna was founded in 1088, Paris in 1200, Oxford 1206, Cambridge 1229 and Montpellier in 1289.

In all these early centres of learning education naturally remained the special concern of the Church. Both the subjects and the methods of instruction were under clerical supervision; educational disputes were settled before ecclesiastical tribunals. The students themselves all studied theology and wore clerical garb. At first, the teaching of law and medicine was not toler-Later, when medicine was introduced. only its theory was permitted since all clerics were enjoined against the shedding of blood. Indeed, surgeons had a hard fight to obtain recognition and the universities refused them the right to be called doctors, which resulted in the practice still found in England of a surgeon being referred to as Mr.

Let us turn now to the state of general medical knowledge, first, as found in the universities and then that without these halls of learning

To begin with, medicine is both an art and a science. The art of medicine was born when the first savage claimed the power to protect his fellow tribesmen from the evil spirits which menaced his health. The science of medicine was of a much later date. Hippocrates in 440 B.C. consolidated the medical knowledge of the Greeks and separated from it the superstitions of mythology. His work was amplified by Galen a Latin author about 160 A.D. The works of these two physicians were preserved by the Arabs and with additions introduced into Spain at the time of the Moorish conquest, about 1000 A.D. Thus, a blending of Greek, Roman and Arab medicine arrived just in time to coincide with the foundation of the universities and became the medical authority of these institutions and remained so throughout the middle ages. Hippocrates was called the Father of Medicine and Galen the Prince of Physicians. Although a surgeon of the 13th century had the audacity to say that "God did not exhaust all his creative power when he made Galen", the teaching faculties considered it rank heresy to question the authority of the one who had been dead 1,800 years and of the other who had been sleeping with his fathers for thirteen centuries. One can well understand the truth of Roger Bacon's belief that one cause of human ignorance was the force of custom which led men to accept too unquestioningly what had been accepted before their time,

The student entered the University from the grammar school. These schools were permanent and significant institutions which were obligatory in every cathedral city and frequently found elsewhere. They held the key to the gateway of knowledge—Latin grammar. Because of this these schools were fundamental to the educational history of the Middle Ages,

and the children often spoke Latin before being able to understand it. The methods of teaching it were substantially the same all over Europe and so the student was an international phenomenon and we find that he was able to transfer himself from one university to another; few English physicians had not visited several continental centres of learning. Unfortunately they clung to the outmoded theories of the ancients.

All this time medical knowledge based on experimental and practical experience was developing outside the universities and it was not for several centuries that it was incorporated into the curriculum of the well known colleges and brought about a more balanced and more complete medical training.

The 14th century medical student after being well grounded in grammar then began his real university course by attending lectures given in the schools by a master in the faculty from which he sought to graduate. These lectures consisted entirely of oral instruction and the scholar was after a time obliged to repeat what he had learned. If he were going on for medicine this preliminary work required five years. During this time he studied the seven arts: grammar, rhetoric, arithmetic, music, geometry, astrology and the three philosophies, natural, moral, and metaphysical. When this was completed to the satisfaction of the university he proceeded to one of the higher faculties of which medicine was one.

There is available information as to student life at Oxford which was more or less similar to that of the outstanding continental universities. Some of the conditions are of interest to the university student of today. There was very slight interference with his private life excepting preventing breach of the peace or enforcing the necessity of his wearing clerical dress. He was allowed to bear arms to and from the university. Apparently however, there was a great deal of laxity in his conduct off the campus for it is said that the poorer students were allowed to beg and no exception was taken to his poaching or the holding up of travellers on the highway to obtain funds necessary for his education. In England particularly it is recorded that many students paid their fees by this method. The students lived in residences but there were no fires in the university buildings and candles were beyond the means of the poorer students. The seniors had an ordinary bed with various gorgeously coloured coverlets. One at Oxford was described as being of red and blue with ostrich feathers. The juniors often slept in truckle beds which could be stored away during the day under the ordinary beds. In their rooms there was usually a table and a few plain jointed stools. A trough of lead or a pitcher and bowl was provided for their ablu-Their recreations presented a curious contrast to those of the present day. Tennis

and chess, for instance, were forbidden but hawking and hunting were considered to be suitable pursuits. It is noted too, that murder which sometimes occurred during a hold-up was not deemed a reason for expulsion from the university and there are several records of such occurrences in the annals of the University of Oxford in the 14th century.

As to lectures, the maximum was three hours a day, some of these one and a half hours long and others three hours. They usually started at six in the morning and at times five in the summer time and in the winter at seven. Many were held before dawn without any light. The students sometimes gathered in a classroom with a floor covered with straw or rushes and with glassless windows. It was contended that the best time for study was between the hours of six and ten in the morning. At first both masters and pupils sat upon straw on the ground, the master having more straw so as to be able to dominate the audience but in 1366 the students were ordered to sit upon the ground "so they might have no reason to be proud". Breakfast was served at ten and the only other meal of the day was supper at six. On fast days dinner was at twelve and there was no supper. At curfew there was a collation or drinking, usually of beer.

Today the texts recommended by the faculty of medicine in the various universities are in-No such difficulty worried the medical student of the 14th century whether he was in Italy, France or England. All that was necessary was to listen and then repeat portions from the works of Hippocrates and Galen and one Arab textbook and these excerpts excluded any reference to the practical application of the subject studied. Medical manuscripts were not plentiful in the 14th century. A hundred years later the University of Paris possessed only twelve. It would appear however that there were medical libraries outside the academic halls to which the student had access. These libraries belonged to the great abbeys or to rich folk. A contemporary catalogue of St. Augustine's Abbey contained over 330 treatises and that of Christ Church nearly 300.

One of the best known of English physicians, John of Gaddesden, who began the study of medicine at Oxford in 1303 wrote a book, the Rosa Anglica, and the list of authorities from which he quotes shows that he was a man of wide reading so he must have frequented some of these medical libraries. To obtain his degree four years later the student was required to dispute with his masters for several days on certain theoretical aspects of medicine which were selected by his examiner. Just what these were at that exact period we have no knowledge but some idea can be gained by a perusal of those of a later date. Here for instance, is an

oral examination at the University of Paris for the degree of medicine in the 17th century.

- From what part of the body did the water come which flowed from the side of the dead Christ when he was pierced by a sharp point of a lance?
 2. Are heroes born of heroes? Are they splenetic?
 3. Is woman an imperfect work of nature?

- 4. Is sneezing a natural act?
 5. Is it salutary to get drunk once a month?
- 6. Does debauch bring baldness?

This makes us wonder whether Butler in Hudibras and Molière in his various satirical plays did not have just cause for poking fun at the medical profession.

When we, with our modern conception of science look back at that of the 14th century, one feels like agreeing with Artemus Ward that "there is nothing that makes man so ridiculous as knowing so many things that ain't so''.

Let us now glance briefly at the medical knowledge as set forth by Hippocrates and Galen and as taught to the students in the 14th century. It was spoken of as humoral medicine. There were four humours namely, blood, phlegm, reddish bile and black bile. Each of these was made up of varying proportions of four elements: fire, air, water and earth. There were also nine qualities, eight unequal and one equal. Of the unequal, four were simple, namely hot, cold, moist and dry. There were several varieties of each of the four humours. There were also three spirits, the first, the natural spirit having its origin in the liver; the second, the vital spirit having its origin in the heart and third, the animal spirit having its origin in the brain.

The mediæval conception of nutrition was quite simple. Foods were divided into two kinds. Good foods were those which brought about good humour and bad foods were those which brought about an evil humour. Foods producing good or evil humours might also be heavy or light. Of the first kind were pork and beef; of the second; chicken or fish. Certain kinds of vegetables produced evil humour. Garlie, we find, was one of them. This was not in accord with the dictum found in the "Regimen Sanatatis" composed for Duke Robert, eldest son of William the Conqueror during a visit to Salernum in the 12th century. Here is the advice in verse:

"Six things, that here in order shall ensue, Against all poisons have a secret power, Pear, Garlie, Reddish-roots, Nuts, Rape and Rue, But Garlie chief; for they that eat it, May drink and care not who the drink do brew: May walk in airs infected every hour, Since Garlic then had powers to save from death. Bear with it though it makes unsavery breath: And scorne not Garlic, like to some that think It only makes men wink and drink and stink.

There were three kinds of fever: First, that in the spirit which was called ephemeral; the second, arose from humours which putrefied and which was therefore called putrid; and third, that which affected the solid portions of the body, and this was called hectic.

The practice of medicine was divided into three divisions, surgery, the giving of drugs, and what was known as the right ordering of the non-naturals. These non-naturals comprised the changes of air, the various seasons, the number and properties of the winds and variety of places and their qualities. Surgery dealt with the two tissues, that is with the flesh and with the bones. These then were the foundations of medicine as given us by Hippocrates and Galen. The Arabs made two contributions to this which complicated and beclouded medical art for many centuries but which later came to be of inestimable value to science. The first of these was astrology the forerunner of astronomy. It is interesting to note here that in their primitive forms, science, magic and religion were one. fact is especially clear in the history of astronomy which developed from the pseudoscience astrology. It seems clear that Ptolemy was the first to link up astrology with medicine. It was he who first associated the qualities of ancient medicine with the planets, but it was a Christian bishop who introduced the signs of the zodiac and was executed, a martyr to his belief. Every medical student was required to study astrology in order that he might be able to observe the heavenly bodies and apply the correct treatment at a time when the planets or stars were in the proper position to influence the astrological fortune of the patient. It was believed in the 14th century that all diseases in the body, their origin, their cure, the rise and progress of epidemics, the efficacy of drugs at the time of blood letting and the preparation of medicine, all were in some way connected with the movement of the planets.

Of all medical procedures, phlebotomy or blood letting was the one most strikingly affected by astrologic beliefs. It was governed by the phases of the moon, tides and the position of the sun in the zodiac; and each one of the zodiacal signs corresponded to a part of the body and determined the point of election for the phlebotomy. Once more from the school of Salernum comes advice showing the influence of astrology on blood letting:

"Three special months (September, April, May)
There are, in which tis good to ope a veine
In these three months the moone bears greatest sway
Then old or yong that store of blood contain
May bleed now, though some older wizards say
Some days are ill in these, I hold it vain:
September, April, May have days a piece,
That bleeding do forbid, and eating geese,
And those are they forsooth of May the first
Of other two, the last of each are worst."

Astrology persisted in medical literature until the end of the 17th century. The belief in the influence of the stars on human life received its authority from a mistranslation of a passage

in Hippocrates but nevertheless it was taught in the universities.

Alchemy, from which chemistry developed, was high in favour in the 14th century. A search for the philosopher's stone and for the elixir of life has long since been abandoned but chemistry and biochemistry hold a very important place in medical education today.

We have already seen that surgery was looked on with disdain by the physician of the 14th century. Since many of the university trained physicians were priests and were enjoined by the church to refrain from the shedding of blood, we can readily understand why instruction in surgery was at a minimum in the early universities. Where then did the surgeon get his training? Many of them after receiving a doctor's degree, which was first given about the year 1200 at Salerno, were called upon to attend the army both at home and abroad and learned the art of surgery in military camps and in the field.

The 14th century surgeon unless he had his doctor's degree from a university was greatly handicapped in many ways. Besides lacking the education, culture and social prestige of their august colleagues the surgeons were allowed to wear only a short robe, the long being reserved for the physicians. Then too the surgeon had few patron saints. This was a cause of many bitter taunts from the medical faculty who had St. Luke himself and perhaps a hundred minor saints, while the poor surgeons, aside from Saint Cosmas and Saint Damien, could muster only a paltry number of canonized patrons. The physicians tried to show their superiority whenever the two corporations came in contact. Thus if it became necessary to bleed the King the first physician held the torch, the surgeon performed the operation at a signal from the physician and the apothecary held the basin.

For 450 years quarrels took place between the physicians and barber surgeons and then began the fashion in England for the barber surgeons to have their own examining board. About the middle of the 14th century there was formed a guild of military surgeons. The demand for them in the 100 Years War and the Wars of the Roses must have been enormous. The conflict in France was not a savage tribal fight but English gold supported large bodies of well paid troops whose lives and health had a great monetary value, so that surgeons were almost as important as artillery, equipment and trans-In Britain the barber surgeon guilds became very important and were found in almost all of the large towns. They built up an excellent system partly by the old apprenticeship and partly by lectures. It was chiefly in this period that there was founded the legal corporation which educated and licensed nearly all British surgeons for 400 years. It was not until a later date that the guild of Apothecaries was formed and then there were three groups of

men practising the healing art.

One would naturally expect to find the leaders in medicine on the staff of the universities, especially in the 14th century, but such is not the Guy de Chauliac (1298-1368) the author of the "Chirurgia" the most important work before Paré, who is generally recognized as the first of modern surgeons, although he had a university education was not a faculty member. Lanfranc (1315) the first bedside teacher and a famous surgeon was denied a university position because he was married. John of Arderne, the first English surgeon of note obtained his training in the Hundred Years War. Arderne's method of treating fistula-in-ano was far in advance of that of his predecessors. John of Gaddesden (1280-1361) whom some think was the original of Chaucer's doctor of physic was a professor at Merton College, Oxford, but his writings were largely a re-hash of Arabic

In arriving at an estimate of 14th century medical teaching one must agree with Singer's statement: "Anatomy and physiology perished". Guy de Chauliac's belief that, "The fundamental mistake of medieval medical science was the divorce of medicine from surgery", must be accepted. And one is justified, too, in heeding the dictum of Roger Bacon as to the lack of adequate authority, the custom of accepting what was accepted before, and the hiding of one's own ignorance with a parade of superficial wisdom. The practitioner of medicine of the 14th century came either from the university where he received no clinical teaching, or derived his experience as a barber surgeon in large towns or in the continuous wars of the period.

If one wishes to obtain a sketch of the character, learning and dress of a physician of this period none can equal that of Chaucer.

With us ther was a Doctour of Phisyk, In al this world ne was ther noon him lyk To speke of phisik and of surgerye; For he was grounded in astronomye. He kepte his pacient a ful greet del In houres, by his magik naturel. Wel coude he fortunen the ascendent Of his images for his pacient. He knew the cause of everich maladye, Were it of hoot or cold, or moist, or drye, And where engendred, and of what humour; He was a verrey parfit practisour.

The cause y-knowe, and of his harm the rote, Anon he yaf the seke man his bote. Ful redy hadde he his apothecaries, To sende him drogges and his letuaries, For ech of hem made others for to winne; Hir frendschipe has nat newe to biginne. Wel knew he th'olde Esculapius, And Deiscorides, and eek Rufus, Old Ypocras, Haly, and Galien; Serapion, Razis, and Avicen; Averrois, Damascien, and Constantyn; Bernard, and Gatesden, and Gilbertyn. Of his diete mesurable was he, For it was of no superfluitee But of greet norissing and digestible. His studie was but litel on the bible,

In sangwin and in pers he clad was al, Lyned with taffata and with sendal; And yet he was esy of dispence; He kepte that he wan in pestilence. For gold in phisik is a cordial, Therefore he loved gold in special.

ASSOCIATION NOTES

Amendments to the Constitution and By-Laws

At the annual meetings in 1944 and 1945, General Council discussed certain proposals for revision of the Constitution and By-Laws designed to broaden the membership of General Council and make it more representative of every aspect of Canadian medicine. After open discussion, General Council instructed that the proposals be given further study.

The Committee on Constitution and By-Laws now recommends that the membership of General Council be broadened by the inclusion of:

- 1. Representatives from the Medical Schools of Canada.
- 2. Representatives of undergraduate students and interns.
- 3. Representatives of certain affiliated societies.
- 4. And that there be members upon the Executive Committee elected at large from General Council.

In order to accomplish the above, it is recommended that:

- (1) Article IX of the Constitution—The General Council—be amended by the addition of the following clauses:
 - (h) Representatives of the Medical Schools of Canada.
 - (i) One representative from each affiliated society whose members are doctors and members of the Canadian Medical Association.
 - Representatives of undergraduates in medicine and interns.
- (2) Chapter VI, Section 2—Duties of the Nominating Committee—Clause (2), be changed to read as follows:

Nomination of an Executive Committee, which, in addition to those who are members ex officio (see Chapter VIII, Section 4) shall consist of sixteen members drawn from General Council, three as members at large and thirteen geographically distributed as follows: three shall be resident in each province in which an office of The Association is located, and one shall be resident in each of the other provinces.

MEDICAL SOCIETIES

The Academy of Medicine, Toronto

The Academy of Medicine, Toronto held its thirty ninth annual meeting in Osler Hall, 13 Queen's Park on Tuesday afternoon, May 7, 1946. The annual re-ports of the executive officers and various committees were presented and a satisfactory year was reported by all concerned. The total Fellowship of the Academy now numbers 1,344 and includes 141 Fellows still on active service with the armed forces. The membership was increased by 81 during the past year though the Academy suffered the loss of twelve by death.

The Board of Trustees reported a particularly busy year owing to the proposed removal from the present quarters in Queen's Park to the new building recently purchased at 288 Bloor St. West. This will entail the removal of one of the largest medical libraries in Canada numbering over 32,000 volumes.

The retiring President, Dr. William Boyd was accorded a unanimous vote of thanks by the meeting for his conduct of the Academy's affairs during a particularly arduous year.

The following officers were elected for the session 1946-47: President—Dr. George F. Boyer; Vice-president—Dr. E. M. Henderson; Honorary Secretary—Dr. H. E. Hopkins; Honorary Treasurer-Dr. K. M. Heard.

Calgary Medical Society

At the annual meeting of the Calgary Medical Society At the annual meeting of the Calgary Medical Society held on April 9, 1946, the following officers were elected for the ensuing year: President—Dr. A. E. Wilson; Vice president—Dr. H. V. Morgan; Secretary—Dr. R. C. Riley; Treasurer—Dr. J. V. Follett; Librarian—Dr. R. R. Hughes. Executive committee—Dr. L. G. Alexander; Dr. L. M. Fairbairn; and Dr. W. S. Johns. At the same meeting, Dr. Harold Orr of Edmonton, President-elect of the Alberta Division, Canadian Medical Association, discussed several questions of importance

cal Association, discussed several questions of importance pertaining to this Association. In addition Dr. Max Cantor, Associate Professor of Biochemistry at University of Alberta, discussed "Endocrinology in relation to modern gynæcology", and Dr. Walter MacKenzie dealt with "Problems of the pyloric mucosa".

La Société de Chirurgie de Montréal

La Société de Chirurgie de Montréal le mercredi 3

1. ARTHRITE CHRONIQUE DE HANCHE ANKILOSÉE AVEC 2 CLOUS DE SMITH PETERSEN .- Albert Couturier.

C'est l'histoire d'une malade àgée de 63 ans, Madame A.D., qui souffrait de la hanche depuis plusieurs années. Les douleurs avaient augmenté considérablement depuis un an et la malade ne pouvait marcher sans support. A l'examen clinique, on constatait une hanche proéminente, un raccourcissement du membre inférieur avec ascension du grand trochanter et limitation des mouvements surtout d'abduction. Les radiographies montraient un fort pincement articulaire au niveau de l'articulation de la hanche avec sub-luxation de la tête du fémur. La tête du fémur était déformée en forme de champignon.

Le rapporteur a pratiqué, en 1942, une ostéosyn-thèse au moyen de deux clous de Smith Petersen passés à travers le col du fémur pour pénétrer dans le bassin. La technique suivie est la même que pour les enchevillements des fractures du col du fémur. Le chirurgien a commencé par diriger plusieurs broches de Kirschner avec contrôle radiologique dans les deux positions. L'opération a duré environ une heure et cinq minutes, y compris l'intervention, les différents contrôles radio-logiques et l'application d'un court spica plâtré. Les

suites opératoires ont été apéritiques et non doulour-euses. La malade quittait l'hôspital dix jours après l'opération et pouvait marcher sans support six semaines plus tard.

Le rapporteur a suivi la malade jusqu'à aujourd'hui et les résultats se sont maintenus. Les clous sont toujours en place et bien tolérés.

2. FISTULES BRONCHO-PLEURO-PARIÉTALES TUBERCULEUSES OBLITERÉES PAR GREFFE MUSCULAIRE.—Gérard Rolland.

fistule broncho-pleuro-pariétale ou bronchocutanée, on entend toute communication entre une bronche, la cavité pleurale et la paroi thoracique. L'empyème peut en être la cause ou l'effet. Les fistules rencontrées au cours des affections aigues guérissent habituellement seules mais les malades, porteurs d'empyème chronique, ont des fistules qui entretiennent cette incurabilité et vice-versa.

La suppuration pulmonaire peut entretenir ces fistules de même que l'épaississement pleural. Celui-ci empêche l'expansion pulmonaire, mécanisme de recouvrement de l'ouverture de la fistule.

Plusieurs procédés employés pour fermer ces fistules. La thoracoplastie a fait sa large part. On peut aviver les lèvres de la fistule par curettage, par cautérisation chimique ou thermique, on peut exciser ou mobiliser—suturer ou inverser—on peut aussi les fermer en glissant de la peau au-dessus. Ce qu'il y a d'important, c'est de favoriser la granulation au niveau de ces fistules et même les combler par ce moyen.

Dans les deux cas que nous présentons, nous avons aployé la greffe musculaire. Abrasanhoff a été le employé la greffe musculaire. premier à employer cette méthode en 1900. De nombreux cas ont été rapportés depuis, mais il s'agit habituellement d'empyème chronique sans précision de la nature. Les deux cas dont je parlerai, sont des cas de tuberculose pulmonaire bien contrôlée.

(1) Diagnostic: tuberculose pulmonaire exsudative excavée à droite III B B.K.: Gaffky II.

Traitement: 27 juin 1945: lobectomie inférieure droite; 13 août 1945: thoracotomie; 1er décembre 1945: Thoraco-Shede—greffe musculaire pour obliterer fistules bronchiques; 20 décembre 1945: fistule guérie.

(2) Diagnostic: tuberculose pulmonaire fibreuse: empyème chronique et ostéite costale tuberculeuse avec

Complications: diabète, urémie, arthrite aigue de l'épaule. Traitement: thoracoplastie et thoraco-Shede; greffe

musculaire; six opérations importantes en 3½ ans, la dernière le 1er décembre 1945 et le patient guéri a son congé le 23 décembre 1945.

Conclusion: notons, (1) La rapidité de la fermeture, après la greffe musculaire. (2) La nécessité d'avoir une plaie pleurale relativement nette. (3) Le grand secours apporté par la pénicillinothérapie particulière-ment lorsqu'il s'agit de lésions tuberculeuses. (4) La grande valeur de la granulation endo-bronchique, même s'il faut la combattre après, par cautérisation après, par endoscopique.

ANTONIO SAMSON, M.D. Secrétaire.

La société médicale des hôpitaux universitaires de Québec

Séance de la société médicale des hôpitaux universitaires de Québec, vendredi, le 1er fevrier 1946.

UN CAS D'HYPÉROSTOSE FRONTALE. - L. LaRue, M. Samson, L. Patry.

Présentation d'une malade atteinte d'un syndrôme d'hyperostose frontale. Dame âgée de 39 ans dont le poids est de 259 livres avec une taille de 5 pieds, chez laquelle l'examen physique et l'examen neurologique n'a rien révélé d'anormal. La radiographie du crâne montre une image caractéristique—la table interne du frontal est épaissie et parsemée d'une néoformation osseuse légèrement verruqueuse et bosselée.

Il semble bien qu'à l'origine de ce syndrôme, il existe un trouble de métabolisme des graisses et du calcium.

UN CAS D'ANOSMIE PSYCHIQUE.—Sylvio Caron.

L'auteur raconte l'histoire d'un célibataire de 35 ans qui à l'occasion d'une gonorrhée chronique aurait souffert d'anosmie, puis de parosmie et enfin d'hallucinations olfactives. Il profite de cette présentation pour rappeler aux auditeurs les voies olfactives, les centres olfactifs avec les signes neurologiques que donne une lésion des centres olfactifs.

Il signale enfin que l'anosmie a été un malaise dont se sont plaints plusieurs commotionnés cérébraux qu'il eut à examiner et que l'on doit affirmer que l'anosmie est d'origine psychique que dans les cas où il n'existe aucune lésion des voies nasales et des voies olfactives.

SEPTICÉMIE À BACILLUS PROTEUS.—C.-A. Painchaud.

L'auteur relate l'histoire d'un cas de septicémie à bacillus proteus consécutive à une infection urinaire due au même agent. Il insiste sur l'allure particulière de la courbe thermique, qui au moins durant une période de l'évolution de la septicémie a présenté l'aspect d'accès de paludisme. Le diagnostic de cette variété d'infection doit être entouré de circonspection, et établi sur la double preuve bactériologique et sérologique, par la recherche des agglutinines dans le sérum de la patiente vis-à-vis son propre germé isolé du sang et du foyer d'infection initial. L'auto-vaccinothérapie lui paraît demeurer le meilleur procédé de traitement, à condition d'être appliqués précocement. Dans ce cas les sulfamidés et la pénicilline ont été utilisés sans succès.

FORME THORACIQUE D'UN CANCER D'ESTOMAC. — Sylvio Caron and J.-R. Desgagné.

Hanot et Gilbert ont décrit une forme thoracique du cancer primitif de l'estomac. On rapporte ici le cas d'une malade, âgée de 40 ans, qui présentait une symptômatologie presque exclusivement pleuro-pulmonaire, traduisant un gros épanchement sanglant dans la cavité pleurale gauche. Du côté de l'estomac, il y avait si peu de troubles qu'il était osé de soupçonner une lésion grave. Mais à l'autopsie, l'estomac présentait à sa face antérieure un petit ulcus perforé. Histologiquement, c'était un petit cancer atypique, asymptômatique, à l'origine de métastases multiples, dans la plèvre, le péricarde, le foie, le rein gauche et la surrénale gauche.

POLYRADICULITÉ POSTÉRIEURE ASCENDANTE À VIRUS.— Charles A. Martin,

Observation d'une jeune fille ayant présenté une infection non suppurée du système nerveux avec lymphocytose rachidienne, probablement due à un virus neurotrope, sans signes généraux, se manifestant uniquement par des paresthésies à disposition nettement radiculaire, absolument bilatérales, rigoureusement symétriques, progressivement ascendantes à partir du plexus sacrolombaire jusqu'à la septième racine cervicale inclusivement. L'extension des troubles à la portion supérieure a été marquée d'un temps d'arrêt progressivement croissant au passage d'un territoire radiculaire au suivant. Puis la guérison a commencé à se faire par le bas au niveau des racines qui avaient été les premières atteintes.

CANADIAN MEDICAL WAR SERVICES

MEDICAL OFFICERS APPOINTED TO THE R.C.A.M.C. - ACTIVE FORCE

MARCH 1946

(Previous sections in January, March, April, May, June, July, September, October, November and December, 1945 and January, March, May, 1946.)

SECTION LXXI

Name	Address	Date of appo	intment	Name	Address	Date of appe	intmont
Name	Addiess	Dute of appe		11 anc	Auuress	Date of appe	ment
		D'' South, Saskatoon	8-2-46		D., 236 George S		19-2-46
Banting	, H. E., 205 Re	osedale Heights Dr.,			F. A., 5 Lake S	hore Road, Timmins,	
	onto		19-2-46	Ont.			19-2-46
Barlay,	G. R., St. Vince	ent Township, Ont.	19-2-46			Ave., Barrie, Ont.	19-2-46
Basmaji	an, J. V., 41 Lap	pin St., Toronto	19-2-46		J. A., 398 Huron		25 - 2 - 46
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		ow St., Guelph, Ont.	19-2-46		H., 12 Peel St.,		19-2-46
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		nwood Ave., Toronto	19-2-46			son St., Toronto	19-2-46
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Cahn, C	. H. W., 64 Adn	iral Rd., Toronto	19-2-46			rescent Rd., Toronto	16-2-46
	J., Mountain Sa		19-2-46			k Ave., Toronto	19-2-46
Clow, L	. R., 215 Lower	William St., Kingston,				hnston St., Kingston	20-2-46
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Clute, I	K., 5 Admiral Re	d., Toronto	19-2-46			ılar Rd., St. John's,	
Cornett	J. W. D., 52 S	imcoe St. S., Oshawa,		Nfld.			31-1-46
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		a Ave., Chatham, Ont.	19-2-46	Ont.			19-2-46
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Wi	ndsor, Ont.		19-2-46	Hutcheor	n, D. E., 117 E	velyn Cres., Toronto	19-2-46

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		e Ave., Toronto	19-2-46	Sask.	Heighte De	16-2-46
		nerston Ave., Toronto	20-2-46 19-2-46	Riddell, A. R., 14 Rosedale	Heights Dr.,	23-2-46
		St. W., Toronto		Toronto	th Dr. Towanta	19-2-46
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Ont.	-,	,	20-2-46	Shusterman, M., 233 Quee	n St. W., Toronto	19-2-46
McCabe.	P. C., 444 Wa	lmer Rd., Toronto	19-2-46	Simpson, R. E., 1751 Hare		1-3-46
	ck, W. B., Uxb		19-2-46	Smith, A. O. C., 22 Bowood	Ave., Toronto	19-2-46
	en, W. J., (no a		19-2-46	Smith, J. D., Cooksville, C	nt.	19-2-46
	h, C. F., Roseto		17-2-46	Smylie, R. D., R.R. 3, New		20-2-46
MacDona	ld, R. K., 80 V	Woodlawn Ave. East,		Spring, W. B., 128 Ava B	d., Toronto	19-2-46
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MacIvor,	J., 801 Edlingto	on Ave. East, Leaside,		Stephenson, R. G., St. Wa	lburg, Sask.	19-2-46
Ont.			19-2-46	Teichman, J. G., 211 Bey	verley St., Toronto	19-2-46
		owdon Ave., Toronto	19-2-46	Thompson, J. S., 77 Bread	albane St., Toronto	19-2-46
		Delhi St., Guelph, Ont.	19-2-46	Tovell, H. M. M., 2 Sulta		19-2-46
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	ston, Ont.	ndas St. W., Toronto	19-2-46	Zack, J. J., 528 1st St.,	new westminster,	25-2-46
	S., 93 Clinton		25-2-46	B.C. Ziskrout, I., 26 St. John's	Place Toronto	19-2-46
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MEDICAL OFFICERS STRUCK OFF STRENGTH OF THE R.C.A.M.C.—ACTIVE FORCE MARCH 1946

SECTION LXXII

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Beaupre	, J. J. E., 4069	Marcil Ave., N.D.G.,		Sas	katoon		19-2-46
	ntreal L. Monroe Terrace	Apt., Richmond, Va.,	22-2-46		er, J., Riviere de L g. C. R., Aurora, C		22-2-46 5-3-46
U.S	S.A.		$11 \cdot 12 \cdot 45$	Brokovs	ki, T. W., 346 Sell	kirk Ave., Winnipeg	20-2-46
Beevor-	Potts, C. H., Goube	ndas St., Vancouver ou, B.C. e St., Kingston, Ont.	12-2-46 8-2-46 26-2-46	Brown,	n, E. H., Vanguard B. C., 327 Queen's D. P., 2 Highview (Ave., London, Ont.	20-2-46 12-2-46 23-2-46
Bernier. Bernste	, J., 4360 Blvd. Pi in, L. L., Old P		15-2-46	Burch, Calarco,	J. E., Box 1056, W J. A., Toronto	eyburn, Sask.	6-2-46 21-2-46
Berry, J Best, D	. W. S., 116 Brock	ern Hospital, Toronto St. E., Oshawa Ont. Carleton Place, Ont.	14-2-46	Cant, D		gton St., St. Thomas, ssing, Newfoundland Albert, Ont.	23-2-46 9-1-46 19-2-46

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Caven, W. H., 121 Jona St., Ottawa	22-2-46		22-2-46
Cayer, J., 2330 Girouard St., St. Hyacinthe, Que.	12-2-46	Hunt, A. L., 1249 Devonshire Cres., Vancouver	12-2-46
Chadwick, R. M., 270 Roslyn Rd., Winnipeg	8-2-46		12-2-46
Chalmers, R. H., 63 Grey St., Fredericton, N.B. Christie, F. M., Cardston, Alta.	12-2-46 $12-2-46$		23-1-46 23-2-46
Clarke, A. M., 134 Sydney St., Saint John, N.B.	6-2-46		13-2-46
Clarke, R. S., 411 Queen's Ave., New West-		Jackson, E. J., 1230 Avenue Rd., Toronto	8-2-46
minster, B.C.	16-2-46	Jackson, J. W., 308 Indian Rd., Toronto	6-2-46
Cohen, A., 6235 De Vimy Ave., Montreal Cohen, M., 6046 Durocher Ave., Westmount, Que.	5-3-46 19-2-46	Johnston, W. G., 75 Crescent Rd., Toronto Kasler, D., 361 Palmerston Blvd., Toronto	9-2-46 26-2-46
Collins, D. R., Canwillian, Man.	1-3-46	Kaufman, P. M., 587 King St., Kitchener, Ont.	7-2-46
Cooper, G. E., Toronto General Hosp., Toronto	6-2-46	Kierluk, E. W., Vegreville, Alta.	4-3-46
Corbett, C. A., Crystal City, Man.	15-2-46	Kilgour, C. S., 84 Crescent Rd., Toronto	12-2-46
Cowan, R. D., Princetown, Ont. Craig, C. G., Olds, Alta.	25-1-46 $27-2-46$	Kline, H. J., 102 Claremont St., Toronto Kraft, K. A., 942 Main St. E., Hamilton, Ont.	2-3-46 5-3-46
Cunningham, J. N., 307 Rushton Rd., Toronto	16-2-46	Krivel, H., 2850 Albert St., Regina	28-2-46
Davies, W. F. A., 200 MacLaren St., Ottawa	21-2-46	Lachance, JW., St. Jean, Orleans Island, Que.	23-2-46
Deeth, J. H., Islington, Ont. Demers, V. C., St. Agapit Co., Lothiniere, Que.	$16-2-46 \\ 8-2-46$	Landa F 221 Poplar Cros Saskatoon	8-2-46 18-1-46
Dickson, L. C., 2341 Queen St. E., Toronto	27-2-46	Landa, E., 321 Poplar Cres., Saskatoon Langille, J. A., Pugwash, N.S.	12-2-46
Donnell, M. M., Saskatoon	2-3-46	La Porte, L. P., 1 S. Charles St., Joliette, Que.	7-3-46
Dorsey, F. R. J., General Delivery, Wyevale,	01 0 40	Large, G. C., 5909 Hudson St., Vancouver	1-2-46
Ont. Dougall, R. P. I., Petrolia, Ont.	21-2-46 $31-12-45$	Larouche, G., Cacouna, Riviere-du-loup Co., Que. Latham, H. W., King St., Beamsville, Ont.	13-2-46 7-2-46
Doupe, J., 407 Roycroft Apts., Toronto	18-2-46	Lavallee, L., Neuville, Portneuf, Que.	22-2-46
Dunlop, W. R., 909-1st St. N.W., Calgary	29-1-46	Law, W. B., 190 Laurier Ave. E., Ottawa	10-1-46
Duffin, J. D., 428½ Jane St., Toronto Duffy, J. L., 268 Central Ave., London, Ont.	23-2-46 4-12-45	Layton, B. D. B., 234 Bloor St. W., Toronto	2-3-46
Duval, P., 4001 St. John St., Quebec	28-2-46	Legresley, L. P., 8671 Henri Julien, Montreal Lever, M. A., 382 Curry Ave., Windsor, Ont.	5-3-46 5-3-46
Dyker, G. R., Rosetown, Sask.	9-2-46	Levine, B. P., 150 St. Joseph Blvd. W., Montreal	8-3-46
Edington, A. M., 2084 Claremont Ave., Montrea		Lewis, J. A. R., 77 Madison Ave., Toronto	21-2-46
Edmison, J. N., 391 Cambridge St., Winnipeg Ein, H. N., Montreal	7-2-46 $15-2-46$	Lewison, E., Vancouver	9-2-46 $1-2-46$
Elliott, F. G., Prescott, Ont.	12-2-46	Lucinsky, S. M., (No address known)	19-2-46
Ellis, G. H., 1893 Davenport Rd., Toronto	9-2-46	Lundon, A. E., 1463 Bishop St., Apt. C3,	
Fahrni, W. H., Vancouver General Hospital, Vancouver	15-2-46	Montreal McBroom I C Brookwille Ont	4-2-46 $18-2-46$
Ferguson, P. D., 406 Tower Rd., Halifax	19-2-46	McBroom, J. G., Brockville, Ont. McClatchie, S., Vancouver General Hospital,	10-2-40
Follack, J. E., Prescott, Ont.	25-2-46		18-12-45
Foster, H. L., 29 First Ave., North Bay, Ont.	28-2-46 $7-3-46$	McKellar, J. C., 3 Old Park Rd., Toronto	2-2-46
Fradette, A., Matane, Que. Frantz, W. J., 3836 King Edward Ave. W.,		MacKenzie, A. L., 360 Runnymede Rd., Toronto McKenzie, H. F., Estevan, Sask.	24-1-46 19-2-46
Vancouver	1-3-46	MacKinnon, J. M., 3014 Balfour Ave., Victoria	28-1-46
Fyshe, T. G., 2075 Lincoln Ave., Montreal	6-3-46	McLaughlin, J. A., Box 1422, Saint John, N.B.	23-1-46
Gadhois, G. E. Y., 781 St. Cyrille St., Quebec Gagnon, L. P., Matane, Que.	22-2-46 31-1-46	McI ean, D. F. B., 50 Chisholm Ave., Toronto MacNaughton, E. A., 5603 Queen Mary Rd.,	8-2-46
Galbraith, H. S. B., 5051 Grosvenor Ave.,		Hampstead, Montreal	8-2-46
Montreal	29-1-46	McPhail, E. M., 325 Waverley St., Winnipeg	12-2-46
Galloway, J. D., Victoria Hosp., London, Ont. Garner, H. L. C., 2133 Cameron St., Regina		MacPherson, M. M., 3549 West 39th Ave.,	23-1-46
Gaudreault, J. C. L., 48 Chemin St., Foye, Que.		Vancouver McSweyn, N. F. A., 375-4th Ave., Kamloops,	29-1-40
George, F. H., 218 Prince Edward St., Saint		B.C.	18-2-46
John Garrais T St Paul Mantmagny Co Oue	27-2-46 29-1-46	Magill, A. L., 1000-5th Ave. E., Owen Sound,	1040
Gervais, L., St. Paul, Montmagny Co., Que. Gingras, G. E., 60 Holyrood, Outremont, Que.		Ont. Malcolm, J. M., 375 Lipton St., Winnipeg	1-2-46 $1-3-46$
Gordon, A. L., 102 Carlton St., Toronto	5-2-46	Margolus, B., 10126-119 St., Edmonton	30-1-46
Gordon, L., Jewish General Hosp., Montreal	5-2-46	Marshall, J. E., 1417. Elphinstone St., Regina	30-1-46
Govan, W. R., 161 Cordova St., Winnipeg Graham. R. W., 22 Evelyn Ave., Toronto	27-2-46 20-2-46	Marshall, W. P., Colborne, Ont.	9-10-45 $2-2-46$
Green, C. P., 75 Bethune St., Brockville, Ont.		Matas, M., Berwyn, Alta. Medine, S. M., 2076 Sherbrooke St. W.,	2.2 30
Greenblatt, J., 233 Stewart St., Ottawa	12-2-46	Montreal	5-3-46
Guilmette, C., 232 Des Franciscains, Quebec Guyatt, B. L., Birksroate, Ont.	20-2-46 $7-2-46$	Mercier, J. P. A. J., 113 de L'Eglisse St.,	14-2-46
Harrison, R. C., Lamont, Alta.	26-2-46	Quebec M'Gonigle, A. C., 43 Cutherbert Cres., Toronto	7-2-46
Hamilton, C. M., Prov. Mental Hosp., Ponoka	,	Mickleborough, K. M., 10 Inglewood Place,	
Alta. Hannay D. G. 15 Wahar St. F. Kitchener	19-2-46	Ottawa Michalyahya P 0244 102 A Ava Edmonton	23-1-46
Hannay, D. G., 15 Weber St. E., Kitchener Ont.	20-2-46	Michalyshyn, B., 9344-103A Ave., Edmonton Miller, M. J., 207-7th St., Saskatoon	26-2-46 4-2-46
Heagy. F. C., 103 Charles St., Stratford, Ont	8-3-46	Mitchell, J. R., 524 Croydon, Ave., Winnipeg	
Heal, F. C., 1084 Redland Ave., Moose Jaw, Sas	k. 1-3-46	Moffat, R. G., Frobisher, Sask.	20-2-46
Henderson, P. F., 52 Undermount Ave., Hamilton, Ont.	4-2-46	Moir, J. H., 41 Springside Dr., St. Vital, Man.	
Hewson, R. W., 244 Dalhousie St., Brantford	,	Morton, W. A., Bangour Hosp., Broxburn,	
Ont.	25-2-46 12-2-46	West Lothiam, Scotland	6-2-46
Hobbs, F. S., 5829 Dunbar St., Vancouver Holland, L. G., 19 Coburg Rd., Halifax	15-2-46	Mullins, J. F., 761 Wallace St., Wallaceburg,	
Howatt, F. F., 42 Water St., Charlottetown	9-2-46	Ont.	23-2-46 17-1-46
Howes, J. E., 1128 Avenue Rd., Toronto	8-2-46 27-2-46	Murray, D. R., 60 St. George St., Toronto Musgrove, J. E., Winnipeg	23-2-46
Howson, F. R., Wingham, Ont.	21-2-10	musgiovo, or mi, trimipos	av

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Mustar	d, R. A., Hosp. fo	or Sick Children,		Sellars, V	V. S., Bonavis	ta. Nfld.	28-1-46
	ronto		7-3-46	Shapiro, I	E., 93 Des Bray	ves Ave., Quebec City	21-2-46
Nadeau	, N., Baker Bro	ok, New Brunswick	12-2-46	Shapiro, I	K. L., St. Josep	h's Hospital, London,	
Naus,	J. H., R.R. 3, Ay	r, Ont.	8-3-46	Ont.			21-1-46
		ia Hospital, London,		Shapiro,	S. K., 307 Du	fferin Ave., London,	
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		mpbell St., Windsor,			H., Sussex, N		15-2-46
On			1-2-46			Bellechasse Co., Que.	25 - 2 - 46
Nichols	on, M. A., Winder	rmere Hotel, Victoria	12-2-46		G. A., Grimsby		31-1-46
Ortara	P. J. A., 1057 Ge	errard St. E., Toronto	1-3-46		N. S., 19 Cob	ourg St., Saint John,	04 4 14
		rston Blvd., Toronto	26-2-46	N.B.	D 35 / 1	G 77 35 1	31-1-46
Ourmet	, C. G. A., St. Sc.	nolastique, Que.	26-2-46			Gen. Hosp., Montreal	28-2-46
Dorles	H. F., 5862 N.D.G	Ave., Montreal	14-2-46		B. W., Nipawi		6 - 2 - 46
Tariee,	H. D. U., 120 N	Iain St., Saint John,	21-2-46		B., 400 S. Vic.	kers St., Fort William,	
Paul J		Sook		Ont.	T 407 December	nu Di Mananta	16-2-46
Paulhus	A. D., Wawota,	nilde de Horton, Que.	6-2-46			ary Rd., Toronto	27-2-46
Pedvis	S., 205 Brown A	ve One	8-2-46 $15-2-46$		d, W. H., Agas		23-1-46
	er, J. O. A., Joliet		1-3-46	Thorrison	E E 1477 204	Gen. Hosp., Toronto	18-2-46
		des Laurentides, Co.	7-9-40			h Ave. W., Vancouver	15-2-46
	Assomption, Que.	des Laurentides, co.	12-2-46	Que.	, O. M., 5 Mul	e St. Joseph, Levis,	6-2-46
		nue Rd., Toronto	12-2-46		R. D. 1800	St. Anne St., Victoria	15-2-46
	M. M., Kansack		1-2-46		I., Vancouve	,	10-2-10
Playfai	ir. F. D., 779 Me	dical Arts Bldg.,	1 10	Vanc		i den. Hosp.,	23-2-46
	milton, Ont.		21-2-46			. Hubert St., Montreal	20-2-46
		Laval St. Jean, Que.	26-2-46		, M., St. Greg		1-3-46
		untain St., Montreal	28-1-46		. J., Drumhelle		23-2-46
		wood Ave., Toronto	8-3-46		D. R., Fenelon		29-1-46
Raynor	, E. F., 1808 Esc	quimalt St., West				ohnston St., Kingston,	
	ncouver	,	14-1-46	Ont.	-, ,	,	30-11-45
Reive,	W. G. M., 70 Mer	rit St. W., Welland		Waugh, 1	D. O. W., 203	Harvard Ave.,	
On			7-3-46	Winn			12-2-46
Rennie	, C. S., Vancouve	er Gen. Hosp.,		Weinstoc	k, J. W., 1025	2 Victoria Ave.,	
	ncouver		15-1-46		lsor, Ont.		22-2-46
	in, N. A., Jordan		15-2-46	White, J.	. V., 1408 W.	45th Ave., Vancouver	12-2-46
		90th Ave., Edmonton	21-2-46	Whitelock	k, C. K., 1241	Victoria Ave., Niagara	
	on, H. S., Box 541		11-2-46		, Ont.		23-1-46
	ille, R., 8338 Drole		12-2-46	Williams,	H. I., Montr	eal Gen. Hosp.,	
	k, J. E., Ohsweke		4-2-46	Mont			16-1-46
	r. F., 3655 Oxende		7-2-46		3. E. D., Ayr,		8-2-46
	C. A., 11012-95th		5-2-46			14th Ave., Vancouver	12-2-46
Rossite	er, F. P., 665 Ann	ette St., Toronto	1-3-46			ge St., Toronto	25 - 2 - 46
		eod Bldg., Edmonton				Buena Vista Rd., Rock-	
	M., St. Pascal, (19-2-46 8-2-46		Park, Ottawa	2 64 2	21-2-46
	R. A., Kemptville		31-1-45		z, S., Lucky L		5-2-46
	urent, J., Causap	in Ave., London, Ont.	6-3-46	Young, I	D. A., 232 Mete	calfe St., Ottawa	14-1-46
		t. Boniface San., St.	0-0-40	Young, (H. W., 152 La	scelles Blvd., Toronto	8-2-46
	tal, Man.	. Donnace Dan., Dt.	18-12-45	0,		MacLaren St., Ottawa	
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CORRESPONDENCE

Irresistible Impulse and Crime

To the Editor:

Psychiatrists across Canada will be very much interested in the special article by W. C. J. Meredith, K.C., M.A., in the April number of the Journal entitled

"Irresistible Impulse and Crime"

Mr. Meredith quite properly emphasizes the in-adequacy of the M'Naghten rules for the expression of modern psychiatric knowledge as it relates to criminology. Mr. Meredith brings up for discussion the desirability of enlarging the concept of insanity as a defence for crime by the "irresistible impulse"? formula. Irresistible impulse has no status or meaning in psychiatry and it is my opinion that if used, it would confuse the issues still further and would not be a progressive step in medical jurisprudence.

Psychiatrists are not at all satisfied with the exist-ing laws and practices pertaining to insanity as a defence for crime. Some of our criticisms might be

listed as follows:

1. The M'Naghten rules were established more than a century ago before there was any knowledge of psychology and psychiatry. They were a great advance in jurisprudence for the time at which they were set forth, but they have not been modified essentially since that time.

2. The M'Naghten rules deal only with the intellective aspects of personality, the emotional and volitional aspects being completely ignored. The great majority of people certified as mentally ill in mental hospitals know the difference between right and wrong but they are deprived of their freedom of action because of mental symptoms arising from disease of the personality other than the intellective.

3. The psychiatrist giving evidence in court is sworn to tell the whole truth. Section 19 of the sworn to tell the whole truth. Section 19 of the Criminal Code, embodying the M'Naghten rules, does not permit a psychiatrist to tell the whole truth if the trial judge insists on a rigid interpretation of this Section. The psychiatrist is permitted to describe only the intellective aspects of the person.

4. The defects in Section 19 of the Criminal Code, mentioned in the previous paragraph, permits varying interpretations on the part of different psychiatrists (and of different judges) which, if apparently contrary opinions are stated, give the public the impression that psychiatrists are giving contrary evidence. This

is a very undesirable situation.

5. The expression of highly technical and scientific opinions on mental disorders cannot be given easily from a witness box, nor can they be clearly understood by the average jury which has had no training in this field.

The crime for which insanity is most frequently offered as a defence is that of murder, and it is unquestionably true that persons with mental disease or mental deficiency may, under certain circumstances at times kill other persons, but there are two special problems relating to legal procedure in a murder trial.

The first of these is that murder is the only

crime listed in the Criminal Code for which the trial judge is not permitted optional sentences in accordance with his own judgment and with the circumstances surrounding the crime. He is obliged to im-

pose the death penalty.

The second peculiarity arises out of the first, namely that modern criminology seeks to be fair with a convicted person, to insist that he pay his debt to society, but that he should also be given every opportunity for reform. The imposition of the death sentence is entirely vindictive and ignores all modern criminological concepts. Moreover, there is no proof that the imposition of the death sentence is an actual deterrent to crime.

In the following cases, the accused was charged with murder. In each case the accused had a mental examination, although psychiatric evidence was not called for in every case. It may appear from a review of these brief reports that legal procedure and the question of sanity might be further considered.

Case 1.-A man charged with murder following the death of an elderly man he admittedly attacked, believing him to be a window peeper, was found not guilty of any offence.

Case 2.—An Indian said to have been rejected from the Army because of mental deficiency, although this evidence was not given in court, was convicted of the murder of a fellow Indian and is sentenced to be hanged.

Case 3.—A sixteen-year old boy, mentally defective, was sentenced to death for killing his employer's The sentence was later commuted to

imprisonment.

Case 4.—A young man with intelligence in the moron group, was convicted and hanged following the murder of a former employer.

Case 5.—A married woman, infatuated with another

man with whom she had been having sex relations over a lengthy period shot and killed him when he tired of her. She was convicted of manslaughter, served a sentence in the Kingston Penitentiary, and was then released.

Case 6.-A man shot and killed two other men and was convicted of murder and is under sentence to be hanged. Apparently conflicting psychiatric evidence was given, but one of the psychiatrist's evidence was that the man suffered from delusions.

Without commenting further on these six cases, in five of which the writer of this letter mentally examined the accused person, I would like to offer certain suggestions for discussion and consideration as follows:

1. Section 19 of the Criminal Code (embodying the M'Naghten rules) should be thoroughly revised or replaced by a Section which would take into account present day knowledge of mental illness and mental

deficiency.

2. A person accused of any serious crime should have a mental examination as soon as possible after his arrest. This examination should be made by an independent Board of Psychiatrists and their findings should be available to the trial judge to assist him in a fuller understanding of all the personality factors which might be involved.

3. Insanity should no longer be made a defence

The jury should not have to pass on the

difficult technical matters of sanity and insanity. The jury will have done its full duty if it decides whether the accused did or did not commit the crime

with which he is charged.

4. If Canada is not yet ready for the abolition of the death sentence, then additional optional sentences should be available to the trial judge if, in his opinion, a lesser sentence is warranted. If, in the opinion of the Board of Psychiatrists, the accused was actually insane at the time he committed the offence, the judge would have authority to arrange for appropriate mental treatment.

There are a number of other interesting points which could emerge from this discussion, but are omitted here to keep the main points clearly under

scrutiny.

It is thought that the recently formed Section on Psychiatry of the Canadian Medical Association would be pleased to confer with the Minister of Justice and the Canadian Bar Association on these and related problems.

G. H. STEVENSON, M.D., Professor of Psychiatry, University of Western Ontario.

April 9, 1946.

To the Editor:

I have read Dr. Stevenson's letter with interest. Space does not permit comment upon all the points he has raised, and the following observations (made from a legal view-point) are restricted to his suggested amendments to the present tests of irresponsibility.

1. Dr. Stevenson proposes that the question of insanity should not be passed upon by the jury, but should be left to a board of psychiatrists, whose opinion whether or not "the accused was actually insane at the time he committed the offence" should, (Dr. Stevenson infers) be binding upon the court. In my view, no such proposal would be acceptable in this country for the following reasons:

(a) The right to trial by jury is a fundamental principle of our constitution, and to substitute a board of experts for the jury (assuming it were constitutional to do so) would establish

a dangerous precedent.

The proposal assumes that the jury's function is simply to decide whether or not the accused was insane; whereas the real question they must consider (and this is common to criminal cases generally) is whether or not the mental element required by law was present. According to law, an insane person may be criminally responsible. It follows that a medical opinion that the accused was "insane" has little meaning in law, unless that opinion was reached in accordance with the legal tests of

irresponsibility.
(c) To determine the state of the accused's mind at the time of the crime, it is necessary to examine witnesses, and it is highly desirable that all witnesses, including doctors, should be examined and cross-examined before a jury in

open court.

2. Adoption of the proposal that "insanity should no longer be made a defence for crime" would be to go backward instead of forward, in my opinion. M'Naghten formula was the result of legal recognition that insanity could not be regarded as "a fixed term having a certain meaning", but that it is a disease of countless gradations, the lesser of which should not constitute a criminal defence. It therefore became necessary to draw a line somewhere on the scale of gradations to separate those classes of mental disease which truly render a person irresponsible for his actions from those which do not. The line may have been drawn badly, but to remove it altogether (as Dr. Stevenson appears to suggest) would put the law back to where it was long before the days of M'Naghten. My submission is this: that the line be adjusted (and that Section 19 be amended accordingly) to provide for a modified recognition of the 'irresistible impulse' defence in addition to the M'Naghten tests. That, in effect, was the recommendation of the Atkin Committee in England and, generally speaking, it is the law in some seventeen American States today.

3. Dr. Stevenson states that "irresistible impulse has no status or meaning in psychiatry". In that event, the prospects of amending the law appear none too bright, because what little encouragement psychiatrists have received from responsible judges and judicial committees in their persistent attacks on the M'Naghten formula, has been concerned for the most part with what has been described, rightly or wrongly, as the "irresistible impulse" defence: (e.g., Lord Atkin's committee advised that the accused should be held irresponsible when the crime was "committed under an impulse" which, by mental disease, he was "deprived of any power to resist"). No doubt there are more accurate descriptions of the condition of inability to abstain from wrong-doing, but I suggest that in advocating any change in the law, the terminology be kept as simple and as intelligible to laymen as is reasonably possible.

4. I think Dr. Stevenson's suggestion that the question of amending the law be taken up by the Section on Psychiatry with the Canadian Bar Association is a good one. However, I suggest that the Minister of Justice be left out of the picture until such time as the doctors and lawyers are agreed upon a definite

course of action.

5. The views expressed by Dr. Stevenson, which no doubt are shared by many others in his profession, may be interpreted as indicating that there is a conflict between Medicine and Law on this important subject. In that connection, the Atkin Committee had this to say: "Much of the criticism directed from the medical side is based upon a misapprehension... When once it is appreciated that the question is a legal question, and that the present law is that a person of unsound mind may be criminally responsible, the criticism based upon a supposed clash between the legal and medical conceptions of insanity disappears".

W. C. J. MEREDITH, K.C., M.A. Montreal, April 24, 1946.

Treatment of Anthrax

To the Editor:

Because of the great number of anthrax cases in Iran, we wish to gather as much information as possible about the treatment of this disease.

I noticed an interesting report by A. F. Perle, M.D., in the Canadian Medical Association Journal, 52: 592, 1945, under the topic, "Anthrax: its incidence and therapy". The writer advises the use of antianthrax serum, organic salts of arsenic (arsenamine, arsenobenzol), and sulfonamides (sulfapyridine, sulfathiazole) for the treatment of the disease.

As I mentioned above, this disease is not rare in our country. It is almost twenty years since we began treating our patients successfully with Lugol solution. During this time I have treated 120 patients with this solution and not a single mortality has been observed. This solution is prepared with every care for sterility as follows:

Iodine					ě								1	gr.
Potassium :	iodide	,											2	gr.
Dist. water												3	00	c.c.

5 c.c. is injected intravenously every day. Patients bear these injections without any pain. During this long period it has been proved to us that the treatment

by this method is always satisfactory and its efficiency is far greater than treatment with the organic salts of arsenic.

A. BAHRAMI, M.D.
P. Director of Pasteur Institute.

Tehran, Iran.

SPECIAL CORRESPONDENCE

The London Letter

(From our own correspondent)

THE NATIONAL HEALTH SERVICE BILL

The Government's acceptance of the Opposition's proposal for the postponement of the second reading of the Bill until after the Easter recess has been generally welcomed. Compromise is the essence of democratic government, and any suspicion that the Government was using steam roller methods to rush the Bill through Parliament would have produced an atmosphere in which reasonable compromise would have been difficult of attainment.

No inkling has yet been given of the extent to which the Government is prepared to meet the wishes of the profession. Mr. Bevan has given the assurance that the structure of the Bill provides for a great deal of decentralization on the administrative side and that doctors and hospital workers will not be civil servants. The profession as a whole, however, is not altogether happy as to the real value of these assurances, and it is hoped that when the Bill is discussed in Parliament the Minister will see his way to pay more than lip service to the very reasonable criticisms of the Bill that have been advanced by the Royal Colleges, Sir William Goodenough and the King Edward's Hospital Fund for London.

The crux of the whole matter is that to as individualistic a profession as that of medicine the mere word "nationalization" has unpleasant associations and that with the best will in the world it is difficult for any Minister to give an absolute assurance that the Treasury will not sooner or later use its dreaded "axe". The leaders of the profession fully recognize that ultimate control must rest with the Treasury, but what they ask is that the Bill should be so worded that a large measure of initiative should be left to the boards of governors of individual hospitals.

Another point upon which clarification has been requested is the composition of the Regional Hospital Boards. From the wording of the Bill it is impossible to gather whether the profession and the voluntary hospitals will have adequate representation on these boards, and, as has already been stressed in this Correspondence, the one thing that the profession dreads more than central control is control by local authorities.

LONDON AS A POSTGRADUATE CENTRE

The announcement that Sir Francis Fraser has been appointed Director of a newly formed British Postgraduate Medical Federation marks the first definite step in the direction of establishing in London a postgraduate centre commensurate with the status of its medical school. While London has for long attracted graduates from the Dominions and the Colonies, the provision of adequate postgraduate facilities for these welcome visitors has never been satisfactory and they have been dependent upon their own efforts or introductions. In spite of the valiant efforts of an outstandingly able staff the Postgraduate School at Hammersmith never quite realized the hopes which accompanied its foundation in 1932.

Full details are not yet forthcoming concerning the new Federation, but it is envisaged that it should consist of a series of Institutes under the ægis of the University of London. Under the able direction of Professor

Alan Moncrieff the Institute of Child Health is already well under way, and the other Institutes to be incorporated cover laryngology and otology, neurology, psychi-atry, and dermatology. A curious omission from the list is tropical diseases, but the failure of London to provide adequate facilities in research or teaching in tropical diseases is one of those mysteries which have never been adequately explained. London has such a wealth of clinical material that there should be no difficulty in develop-ing a postgraduate school that will attract graduates from all parts of the Commonwealth. All that has been lacking in the past has been adequate correlation, and this the new Federation should provide.

A NEW APPROACH TO THE POPULATION PROBLEM

There was started in the first week of May, an investigation that it is hoped will throw some light on the social and economic aspects of childbirth. A joint committee has been set up by the Population Investiga-tion Committee and the Royal College of Obstetricians and Gynæcologists to obtain some definite data on the medical and other costs associated with the birth of a baby. This step has been taken because of the evidence that the financial burden of childbirth may be a deterrent to parenthood in all sections of the com-The aim of the committee is to obtain as precise information as possible as to how this burden is distributed: how much of it goes in medical fees, payments for extra domestic help, clothing of the baby, etc. This information can obviously only be obtained by a personal approach to the mother, and it was therefore decided to interview all mothers in the country who had borne a child between March 3 and 9 inclusive, and that the interview should take place eight weeks after delivery. Hence the reason for the investigation after delivery. Hence the reason for the investigation being carried out at the moment. The information thus obtained may well be one of the greatest practical con-tributions so far made towards solving the problem of the declining population.

THE PARAPLEGIC EX-SERVICE MAN

Much interest is being shown in a recent development in rehabilitation. A survey has shown that of some 500 men in this country suffering from paraplegia due to war injuries, 40% are married men averaging 26 years of age. The problem of the future of these unfortunate men has been engaging the attention of the British Legion for some time, and last month the Legion opened a "test home" for them. The house will accommodate two families, and the aim is to give the paraplegic and his family an opportunity to rebuild family life. Each family will live in the house family family life. Each family will live in the house for a month and during this time the wife will be gaining experience in looking after her husband, and at the same time running her home and caring for the children.

An important part of the training will be to develop in the wife the correct attitude to her husband, an attitude free from pitying solicitude and one which will always remind him of the many ways in which he is whole and normal. If at the end of the month the wife feels that she cannot cope with the situation, then the Legion will consider other ways of helping the husband.

The experiment is an interesting one, and the only criticism that has been offered is that a month may prove too short a period for the man to readjust himself, and that the failure of the experiment in individual cases will be a great blow to the man's morale and selfrespect.

WILLIAM A. R. THOMSON.

London, May, 1946.

A straw vote only shows which way the hot air blows .- O. Henry.

ABSTRACTS FROM CURRENT LITERATURE

Medicine

Syncope in Blood Donors. Moloney, W. C., Lonnergan, L. R. and McClintock, J. K.: New England J. Med., 234: 114, 1946.

Among 16,133 blood donors 689 developed syncope, an incidence of 4.2%. Although some cases were severe no important sequelae were observed but the importance of eliminating persons with organic heart disease as donors is pointed out. Since 50% of cases of severe syncope gave a history of easy fainting such a history should also be cause for rejection. Psychic factors are of great importance in causing syncope and warrent attention. The employment of donors who are

excessively tired or nervous should be avoided.

Immediate treatment of fainting consists of placing the patient in a supine position with the feet elevated. It is important to maintain recumbency until the blood pressure returns to normal. Vaso-constrictor drugs, such as N-methylamphetamine, may be of value.

NORMAN S SKINNER

The Early Diagnosis of Phlebothrombosis. Moses, W. R.: New England J. Med., 234: 288, 1946.

Thrombosis of the deep veins of the lower leg, with the common complication of pulmonary embolus, is of frequent occurrence among patients confined to bed. Proximal vein ligation is generally conceded to be the treatment of choice and should be carried out as soon as thrombosis is suspected. Early diagnosis of the onset of thrombosis is therefore of the utmost importance.

Venography has proved disappointing as a means of early detection of the thrombotic process. It is a technically difficult procedure, is not without danger and gives rise to many misleading results. Homan's sign likewise is frequently misleading since it is positive in

great variety of conditions involving the lower leg. The following diagnostic procedure is advocated by the author. First the posterior calf is searched for deep tenderness by direct finger-tip palpation. After level of tenderness has thus been determined the calf is firmly compressed from side to side and, in the presence of bland venous thrombosis, little if any tenderness will be evident, serving to differentiate from tenderness of other structures of the leg. Since these two manœuvres do not exclude tenderness of the deep calf muscles, such as is present in a peripheral neuritis, the third part of the test consists of a brief neurological examination (cutaneous sensation, vibration sense, deep reflexes and position sense of toes).

Details of examination of groups of patients with varying conditions is presented to indicate the high degree of effectiveness of this method in the early diagnosis of phlebothrombosis, NORMAN S. SKINNER diagnosis of phlebothrombosis.

Absorption, Distribution, and Excretion of Streptomycin. Dadcock, J. and Hettig, R.: Arch. Int. Med., 77: 179, 1946.

Streptomycin is an antibiotic substance from actinomyces griseus, active over a wide range of bacteria including many not sensitive to previously known cheminal and the state of the sta cal agents. Among these is the tubercle bacillus. unit of streptomycin is defined as enough to inhibit growth of escherichia coli in one c.c. of nutrient broth. This agent has already been found effective in the

treatment of typhoid fever.

A method for determining concentration of streptomycin in various body fluids is described. Some ward patients and normal volunteers were used in this investigation of streptomycin levels in various body fluids.

Distilled water or sodium chloride solutions were used.

Findings.—(1) No evidence of impaired renal function. (2) Intravenous administration produced much higher levels than intramuscular, while oral administration produced no blood level of any significance, even with large single doses. (3) Excretion by urine was greatest in the first two hours, after which minimal amounts were found in urine; on the whole slower than with penicillin. (4) Following oral administration very large amounts were found in the stools. (5) In the presence of inflammation such as pleurisy the level in the aberrant fluid eventually exceeded that in the serum. The spinal fluid levels were higher if inflammation was present. (6) Frequent injections or continuous intravenous administration is considered necessary to maintain blood levels.

P. M. Macdonnelle

Lack of a Specific Urethral Lesion in Exertional Urinary Incontinence. Muellner, S. R.: New England J. Med., 234: 400, 1946.

A comparison of a group of 95 women suffering from exertional incontinence with a control group of 45 (all continent but with evidence of past obstetrical trauma) showed no significant anatomical differences and there were no constant anatomical findings to account for the incontinence. Delay in voluntary inhibition of the detrusor muscle was evident on fluoroscopic examination of the diodrast-filled bladder of patients with exertional incontinence as compared with the prompt detrusor inhibition of controls,

It is suggested that exertional incontinence is due to an acquired dysfunction of the detrusor muscle rather than to anatomical defect and that obstetrical trauma is not an etiological factor.

NORMAN S. SKINNER

Surgery

Treatment of Jaw and Face Casualties in the British Army. Clarkson, P. W., Wilson, T. H. H. and Lawrie, R. S.: Ann. Surg., 123: 190, 1946.

Results of treatment of 1,000 jaw casualties are reported. Seven hundred were missile wounds, 300 the result of vehicle accidents or brawls. Primary closure of a face wound is more often possible and safer than it is in most other sites. Missile tracts are capable of thorough excision. Free blood supply ensures maximal survival. Cases must be held by the surgeon for three to five days. Primary closure shortens healing time and diminishes the incidence of bone infection. Where possible jaw fixation should be done at the same operation. 20 to 30% of maxillofacial missile wounds are suitable for primary final repair. Primary repairs are done when the wound looks clean, is under thirty-six hours old, and tissue loss such that repair from local tissue is possible. All dead tissue is meticulously removed. Skin excision is minimal. A non-levelled edge is Closure is done without prejudice to late repair. Major flaps have been used seldom in early Traumatic antrostomies with gross loss of skin have been covered with a thin split graft. Primary free grafts to the face nearly always need a late cos-Primary metic repair. Mucocutaneous suture has been done when tissue loss has been too great to permit primary repair. Fistulæ are closed using mucosal flaps. The general scope of early closure of facial wounds is not materially increased by the use of penicillin.

Hemorrhage in a facial wound is almost always controllable by local attack on the bleeding point through the wound.

Upper pharyngeal wounds are treated by thorough track toilet with finger or forceps. External or internal approaches are unnecessary. Of 50 pharyngeal wounds 4 resulted in osteomyelitis of the spine and internal pharyngeal fistula. The risk of serious infection is greater in lower pharyngeal wounds. Wounds of the laryngeal pharynx should be exposed to establish dependent drainage. A number of early cases were treated by full exposure, excision of the track, and closure in layers. Coincident tracheotomy was done.

Early removal of all detached or infected bone was done in cases of comminution. If a bone gap was present all loose fragments were removed. Prophylactic dependent drainage of nonsuppurating mandibular fractures delays healing, and can infect bone.

Antral wounds provide a favourable field for radical surgery and early closure. The track is thoroughly excised. Intact nasal and antral mucosa is left. Nasal antrostomy is done. Maxillary fragments of no structural value are removed. Major alveolar fragments, and the orbital floor, are treated conservatively. Soft tissues are closed in layers over the traumatic antrostomy. Buccal or antral fistulæ are closed whenever possible. For these a large single flap of buccal mucosa is often successful.

A missile fracture of the jaw is best fixed within two days unless (1) there is an associated wound of tongue or pharynx, or (2) nasal obstruction is present. Then intermaxillary fixation is best delayed for a week. It should be done without an anæsthetic if possible.

A large majority of jaw fractures can be treated throughout by wire. In the first instance wiring is best for nearly all missile injuries. Eyelet wiring has been the most widely used method. It requires close supervision. Maintenance of 60 cases treated by wire will fully occupy one dental specialist. Elastic intermaxillary fixation has been reserved for cases needing gradual reduction. Stainless steel wire 0.5 mm. is used for eyelets, double 0.35 mm. for intermaxillary fixation. Three pairs of eyelets are usually enough.

A conservative policy regarding teeth in shell wounded jaws is wise. Many teeth involved in fracture lines will survive, be of value for fixation, and cause no trouble. Teeth in the single fracture line of an accidental fracture are best removed at primary operation, except a firm third molar.

Sectional cast silver closed-cap splints fitting closely round the gum margin were standard definitive fixation. The planning and application of the cast metal splint is best left until the course of the facture after primary surgery is apparent. In only a small group that cannot be properly fixed otherwise must the disadvantages of forward splinting be accepted. To immobilize a jaw by wire requires a yard of wire and a pair of forceps: it requires a ton of equipment and a skilled mechanic to make two sets of cast metal splints daily. Edentulous cases were splinted by acrylic or vulcanite Gunning splints fixed by per alveolar and circumferential wiring. Pinning was used in 15 cases to control edentulous posterior fragments. Sequestration occurred in one case. Pins are unsuitable for the early treatment of shells with major bone gaps. Interosseous wiring was used in 15 cases. It was uniformly successful in fixing and producing rapid union of endentulous posterior fragments in linear closed fractures.

Cancellous chip grafts were used in 14 cases. The earliest was done 60 days from wounding: all except 3 within 100 days. In 8 cases a graft was inserted 1 to 4 weeks after soft tissue healing. There were no complications. All united. Scar corrections have been done 1 to 4 weeks after final healing. Excision and undermining followed by 2 layer closure using local flaps was the standard method. If this was not feasible full thickness postauricular skin grafts were used for eyelids, dermatome grafts for cheeks and foreheads. Epithelial inlays were needed in 5% of cases returned to duty. Perhaps half the long term cases need it before repair is complete. Trismus is common after wounds of muscle attached to the ascending ramus. It commonly occurs after the second week. Prophylaxis consists in chewing gum and using a wedge. Persistent trismus cases are forcibly dilated under anæsthesia and a prop inserted. The prop is worn for 5 days, then intermittently for ten days. This has been successful. No recurrences have been seen.

Thirty-three of the 1,000 cases died. In 18 cases the maxillo-facial injury was not a major factor. Half the total deaths occurred within the first week. Causes were hemorrhage, suffocation, gas gangrene, carotid thrombosis and toxæmia. Three deaths were avoidable. They occurred in dark wards or tents full of fresh battle casualties. Early deaths are due to hemorrhage and suffocation; late deaths due to pulmonary complications. A major factor in the low mortality was the presence of an experienced anæsthetist.

Lumbar Appendicitis and Lumbar Appendectomy. Babcock, W. W.: Surg. Gyn. & Obst., 82: 414, 1946. Retroperitoneal phlegmon and perinephritic abscess may result from the spread of infection originating in an acutely inflamed appendix lying against the posterior parietal peritoneum without gross perforation. Such inflammation may not be detected by the surgeon performing appendectomy through an anterior incision.

This unusual type of appendicitis shows little or no signs localized to McBurney's point. Pain and tenderness may be noted over the distribution of the genitofemoral nerve: anterior thigh and right scrotum or labium, the lateral femoral cutaneous or obturator Characteristic are lumbar pain, associated with pain in the thigh and scrotum, and vesical irritation.

The lesion should be approached by an incision above the right iliac crest, removing the extraperitoneal exudate and opening the peritoneum behind or below the BURNS PLEWES cæcum.

Toxæmia Syndrome After Burns. Walker, J. Jr., et al.: Arch. Surg., 52: 177, 1946.

Following an extensive thermal burn, a complex derangement of normal physiological processes develops, which can be separated into at least two components, shock and toxemia. For many years, shock and toxemia were regarded as one process. The authors review the data on burn toxemia at the Pennsylvania Hospital during the past five years, during which studies have been made on 213 patients. In 1940, a series of tests was carried out on three burned patients at the Pennsylvania Hospital. These patients were given plasma promptly, and it is believed that at no time were they in shock but nevertheless, they showed definite impairment of hepatic function.

Some tests of hepatic function was carried out on 154 patients with a rather extensive series of tests of hepatic function in 51 of these patients. Local treatment varied in these cases. A careful study of renal function was carried out on 28, including fractionation of non-protein nitrogen in blood and urine. During 1943-1944, 26 patients died and 23 of the cases came to autopsy. The data which the authors present are to autopsy. The data which the authors present the based on the observation and study of these cases and represent the combined efforts of a considerable group of workers. The authors conclude that damage to the bistologically is usually mild liver both functionally and histologically, is usually mild if tanning agents are not used in the local treatment of the burned surface. Renal damage, consisting in a toxic nephrosis was a constant part of the picture of toxemia in fatal cases. There is a pronounced rise in the plasma non-protein nitrogen, which is of considerable prognostic significance. Elevations of plasma nonprotein nitrogen above 100 mgm. % were seen only in

Certain deaths from burns seem best explained on the basis of damage to the central nervous system. Pronounced changes, consisting in degeneration of ganglion cells and ocdema occurred and were most pronounced in the hypothalamus and cortex.

G. E. LEARMONTH

Obstetrics and Gynæcology

Carcinoma Corporis Uteri in 2 Sisters Aged 34 and 32 Years. Purdie, A. W.: J. Obst. & Gyn. Brit. Emp., 52: 575, 1945.

It is erroneous to state that corporeal uterine carcinoma never occurs before the menopause. Two cases of corporeal uterine cancer occurring in sisters aged 34 and 32 years of age are recorded. The diagnosis in each case is substantiated by microphotographs. That these are not isolated cases is demonstrated by a brief review of the literature. Cases occur even in childhood.

In the Warthin family, among 174 members reaching the age of 25, 41 persons developed 43 primary car-cinomas: 23 of these occurred in females, and of these 23, 15 were uterine corporeal adenocarcinomata: there was not any case of cervical carcinoma in the family (Macklin, Hauser). Of the 15 subjects with uterine

adenocarcinoma, 6 were under 45, their ages ranging from 39 to 44 years. In only four of these was there histological confirmation of the diagnosis. There was only 1 under 40 years of age, and in that case the diagnosis was not confirmed histologically.

Myasthenia Gravis and Pregnancy. Wilson, A. and Barr, S. J.: J. Obst. & Gyn. Brit. Emp., 52: 584,

The literature on myasthenia gravis associated with pregnancy is reviewed. A case of pregnancy in a patient with myasthenia gravis is described in which the chief features observed were a mild relapse in the latter half of the pregnancy and the first 4 days of the puerperium. The labour was normal and a normal child was delivered. A definite remission of signs and symptoms was observed on the 9th day of the puerperium which continued for months. There is no indication that pregnancy, labour, or nursing adversely affects the course of myasthenia gravis in a patient treated with prostigmin and ephedrine. P. J. KEARNS

Dermoid Cysts of the Ovary: Their Clinical and Pathological Significance. Blackwell, W. J., Dockerty, M. B., Masson, J. C. and Mussey, R. D.: Am. J. Obst. & Gyn., 51: 151, 1946.

Study of the data obtained from the records of 225 patients who had cystic teratomas removed surgically at the Mayo Clinic and from the microscopic examination of 100 consecutive tumours permits of drawing the following conclusions. Ectodermal derivatives were present in 100% of the tumours, mesodermal structures in 93%, and entodermal derivatives in 71% of these cysts. high percentage of mesodermal and entodermal elements was due to the fact that multiple sections have been examined microscopically. Serial sections would probably have revealed more. The term "dermoid" is inaccurate and should be replaced by the term "cystic teratoma". The hypotheses that have been advanced to explain the histogenesis of these neoplasms do not adequately explain their origin. These tumours occurred with equal frequency in either ovary. Twelve and four-tenths per cent were bilateral. The average diameter was 8.2 cm. The incidence of cystic teratomas was 5% of all ovarian neoplasms. Malignant lesions occurred in 3% of cystic teratomas. Symptoms associated with these cysts had no differential diagnostic value.

Surgical removal was the treatment of choice, but when possible, resection of the tumour was done to Ross MITCHELL conserve ovarian function.

Oto-Rhino-Laryngology

Late Secondary Tonsillar Hæmorrhage. Neivert, H.: Arch. Otolaryn., 42: 14, 1945.

Different investigators demonstrated that the oral administration of acetylsalicylic acid and sodium salicylate to human beings in daily doses of 20 to 80 gr. (1.3 to 5.3 gm.) consistently produced hypoprothrombinæmia and hypocoagulability of the blood; that this condition can be prevented by concurrent administration of vitamin K; consequently the hemorrhagic manifestations of hourself aftern and the late post-tongillectomy bleeding rheumatic fever and the late post-tonsillectomy bleeding may be a concomitant effect of salicylate therapy.

As hypoprothrombinæmia interferes with coagulation, the prothrombin time must be done in each patient undergoing tonsillectomy: the normal is 17 to 24 seconds according to the Page technique. A continuation of acetylsalicylic acid daily dose of 2.4 gm, for 4 to 5 days resulted in a prothrombin time of 32 seconds; but in relation to the nutritional intake and the reserves of vitamin K of the subject.

If acetylsalicylic acid is an etiological factor in the occurrence of late post-tonsillectomy, it would seem logical to eliminate it from the postoperative routine. The author proved that water-soluble vitamin K-like

compound synkayvite prevents the undesirable side-effect

of acetylsalicylic acid.

There are other important factors in the causation of late post-tonsillectomy bleeding, such as: vitamin C deficiency, abnormal distribution of the blood vessels supplying the tonsils, excessive trauma at operation, menstruation, pregnancy, nutritional deficiency, disease of the liver, blood dyscrasia, syphilis and infection of the tonsillar fossæ.

N.B. The chewing of aspergum or the use of aspirin mouth washes and gargles, oral intake of acetylsalicylic acid, should be avoided following tonsillectomy.

V. LATRAVERSE

Radiology and Physical Therapy

Transient Successive Pulmonary Infiltrations (Löffler's Syndrome). Eichwald, M. and Singletary, W. V.: Radiology, 46: 258, 1946.

We are dealing with a clinical picture which presents a mild course, shows fleeting, successive, often multiple pulmonary lesions, and which terminates, as a rule, rather soon in complete restoration to normal. There is also present a varying degree of peripheral blood stream eosinophilia. The case presented shows all the typical clinical, laboratory and roentgenological features previously mentioned, but the etiological agent was not definitely determined. The responsible antigen was probably of bacterial origin, possibly from the chronic cervicitis and endometritis.

One must conclude that there are many and varied agents which might be responsible for an allergic pulmonary response. This may be set in motion by a systemic allergen, as in bacterial or pollen sensitivity, or it may be a local manifestation, such as is seen in the presence of Ascaris larvæ in the lungs. Since the pulmonary shadows are generally due to a secondary allergic response, it is permissible to compare them with the "id" reaction of the dermatologist. We venture to call the pulmonary manifestation a "pneumonid".

R. C. BURR

Correlation of Gastroscopic, Roentgenological and Pathological Findings in Diseases of the Stomach. Benedict, E. B.: Am. J. Roentgenol., 55: 251, 1946.

Two hundred and forty-five cases of proved carcinoma, gastric ulcer, duodenal ulcer, jejunal ulcer, gastritis, benign tumour, lymphoma, sarcoma, metastatic carcinoma of the stomach wall, and normal stomach have been studied in an attempt to correlate the roentgen and gastroscopic findings in each case with the known pathological diagnosis. Although it is unfair to compare the roentgen examination with gastroscopy, since the latter supplements the former and is in no way competitive, it can be stated that in certain instances the roentgen examination appears to be superior to gastroscopy, and in other ways gastroscopy appears to be

superior to the roentgen ray.

The roentgen examination and gastroscopy were about equal in 54% of the cases, roentgen examination was considered superior in 29%, gastroscopy superior in 17%. The chief causes of failure in gastroscopy are mechanical. If mechanical difficulties could be eliminated the number of cases in which the roentgen examination appears to be superior to gastroscopy would be reduced to 13 (6%) as against the 38 cases (17%) in which gastroscopy seemed more accurate. From this analysis it appears that if the gastroscopist can get a satisfactory view of the lesion his chances of reaching a correct diagnosis are greater than those of the roentgenologist. Gastroscopists must, therefore, strive to bring about improvements in the gastroscope so that blind areas may be eliminated and biopsies easily taken. Greater diagnostic accuracy is attainable when both methods are used co-operatively than when either method is used alone.

The proper procedure for the patient is all-important and to this end there must be close co-operation between the clinician, roentgenologist, gastroscopist and pathologist.

R. C. Burk

Hygiene and Public Health

he Incidence of Sepsis in Industrial Wounds. Williams, R. E. O. and Capel, E. H.: Brit. J. Indust. Med., 2: 217, 1945.

The problem of industrial sepsis cannot be solved simply by the provision and efficient management of an industrial surgery. Its solution lies not in adequate and early treatment of wounds, but in a program of accident prevention. This conclusion was reached after a detailed investigation of the prevalence of sépsis among 7,430 workers in an engineering factory during 1944. Tables present the findings. During the year there were 266 reportable accidents; i.e., 266 workers had accidents which led to more than three days' absence from work. Of these, 123 had no open wound. Of the remaining 143, 73 (51%) had septic lesions, in most cases probably arising from trivial wounds which would not have resulted in loss of time unless the sepsis had developed. Further analysis of the factory records shows that of the 73 wounds reported as septic, 90% were septic when first seen at the factory surgery.

Analysis of all wounds (reportable and non-reportable) shows that during the year there were 8,101 first attendances at the surgery; 7,051 with fresh wounds and 1,050 with already septic lesions. The authors estimate that about 350 of the 7,051 fresh wounds probably developed sepsis while under treatment. In order to assess the risk of sepsis in trivial wounds, a census, by department, was taken of all wounds inflicted on one day. This indicated that between 6 and 16% of the workers suffered an injury, but only 9 to 25% of those injured, attended the surgery. The authors estimate that the incidence of sepsis among the untreated wounds was 1 to 2%.

The investigation clearly established that trivial wounds are extremely common in the factory and that the great majority of septic lesions seen in the surgery are septic when first seen. They probably arise from trivial injuries untreated at the time of the accident.

MARGARET H. WILTON

Occupational Eye Diseases. Minton, J.: Brit. M. J., 211, February 9, 1946.

In this article the author stresses the importance of a thorough understanding of the patient's occupation when diagnosing and treating eye injuries and diseases. Details are given of acute and chronic keratitis, of lens opacities and of eye diseases produced by certain industrial poisons. A number of instances have been reported of keratitis due to hydrogen sulphide. This condition has been found among workers in an artificial silk factory and in the sugar industry. It has been shown that the presence of 10 parts in a million of hydrogen sulphide in the air is sufficient to cause this trouble. Forms of keratitis have been experienced among workers in other industries including furniture trades, metal industries, agriculture, stone cutting and sand blasting. Its incidence in the artificial silk industry has been considerably reduced by improved methods of ventilation. Similarly the incidence of lens opacities among glass workers has been reduced by the provision of protective goggles; furnace workers are still inefficiently protected. Among the industrial poisons that produce eye diseases are methyl alcohol, carbon bisulphide, lead, and arsenic.

The author describes the service provided by the

The author describes the service provided by the department of industrial ophthalmology in the Royal Eye Hospital, London, England. The ophthalmologist meets regularly in committee, with skilled engineers, safety officers, and makers of preventive appliances, to consider the cases referred to the hospital. In each case the occupational cause is all-important and must be determined. Treatment is suggested and also means of prevention. He deals particularly with cases which were referred to this department, of ocular affections resulting from electric welding, as "arc eye" and chronic superficial keratitis.

The author feels that to ensure further success in the

The author feels that to ensure further success in the fight against occupational injuries and disease, it is essential that departments of industrial ophthalmology be established.

MARGARET H. WILTON

OBITUARIES

Dr. Hector Aubry died on April 18 at his home in Montreal, following a brief illness. He was in his 68th year

Born in Montreal, he had many friends in medical, educational and military circles here. During the Great War he was medical examiner with the 65th Regiment, held the rank of major and was a member of the local military revision board. He maintained his connection with the 65th Regiment and was still attached to it at the time of his death.

Following his primary education at local schools, he attended Laval University in Montreal and received his doctor's degree there in 1902 before going to Paris

for three years of postgraduate studies.

Dr. Aubry is survived by his widow and one daughter.

Dr Emmanuel-Persillier Benoit est décédé le 14 avril en sa demeure, a Montréal, après une courte maladie, à l'âge de 76 ans.

Né le 24 décembre 1869, il avait été admis à la pratique de la médecine en 1892. Quatre ans plus tard, il avait été nommé à la clinique médicale de l'hôpital Notre-Dame. En 1899, il avait remplacé le Dr Demers au cours de pathologie interne et, en 1908, avait été nommé professeur de clinique médicale à l'hôpital Notre-Dame. En 1913, il était devenu membre du conseil de la faculté de médecine de l'université de Montréal, dont il fut le secrétaire de 1929 à 1945. En 1939, il avait pris sa retraite avec le titre de professeur émérite, tout en restant membre du conseil de la faculté jusqu'en 1945.

Dr. Benoît était officer d'Académie, membre correspondant de l'Académie de médecine de Paris, membre de l'American College of Physicians. Il était aussi membre honoraire de la Société médicale de Montréal, président de la Commission des gardesmalades, directeur du service médical de la compagnie d'assurance La Sauvegarde. Il était médecin consultant à N.-D. de la Merci, et médecin honoraire de l'hôpital Sainte-Justine.

Il laisse sa femme, et trois fils.

Dr. Gordon Grote Copeland, aged 61, died on May 1 in Toronto. He suffered a brief illness from a heart attack.

One time head of the Maternity Department of the Toronto Western Hospital, he was instrumental in building up this department. For many years consulting surgeon at the Toronto Western Hospital in gynæcology and obstetrics, Dr. Copeland was noted for improvements and in the procedure adopted in several types of operations, chiefly Cæsarean section.

Born in Boston, son of the late Jacob J. and Alice Copeland, he came to Toronto as an infant. In his youth he excelled as an elocutionist of classical works. Hs attended Parkdale Collegiate and McMaster University; graduating in arts from Victoria College and in medicine from the University of Toronto, where he was prominent in track and field sports.

Dr. Copeland engaged in extensive postgraduate study, taking courses in New York, Boston and Buffalo. He studied under Sir William Osler in Oxford, England, and was for a time assistant superintendent at the sanitarium in Dovosplatz, Switzerland. He also studied at Dublin Rotunda Hospital, Dublin. Returning to Toronto about 1913, he established a practice here and became head of the maternity department of the Toronto Western Hospital. For some time he had been a member of the Auxiliary Board of Examiners of the College of Physicians and Surgeons. He was a member of the Academy of Medicine and Christ Church (Anglican), Deer Park.

In addition to his practice, Dr. Copeland was a teacher, instructing missionaries designated for the foreign mission field in preparation for medical work. Surviving are his widow, a son and a daughter.

Dr. William Albert Elgie died suddenly on April 6, at his home in Chatham, Ontario. He was 53 years of age. Dr. Elgie graduated in medicine from the University of Western Ontario in 1919. He was a member of the Kent Medical Association. As a hobby, he purchased a 1,800 acre farm near Bothwell, where he cultivated evergreen trees and also raised hackney horses.

He is survived by his widow, two sons, two brothers and a sister.

Dr. James A. Gillespie, aged 75, senior member of the Canadian Medical Association and well-known in Vancouver for his youth work, died in Vancouver General Hospital, April 9.

Dr. Gillespie was born in Ontario and received his early education in Montreal. He came to British Columbia 43 years ago. He was past president of the Canadian Amateur Basketball Association and governor of Y.M.C.A. His affiliations included the Kiwanis Club, the Masonic Order and the I.O.O.F. He was also a director of the Alexandra Neighbourhood House

He is survived by his widow, one daughter, one son, a brother and a sister.

Dr. Ross G. Howell passed away on April 15 at his home in Jarvis, Ontario, following a lengthy illness, in his 81st year. Dr. Howell graduated from the University of Toronto in 1890 and had spent most of his life in Jarvis. Active in affairs of the community, he had served as a member of the Jarvis Village Council. His wife predeceased him in 1917. Dr. Howell retired from active practice about four years ago. He is survived by one son and one brother.

Dr. Horace Aubrey Jones, aged 43, died at Royal Jubilee Hospital, Victoria, March 28. Dr. Jones, a native of Victoria, had been assistant superintendent of Tranquille Sanatorium and senior member of the medical staff in length of service at that institution prior to moving to Victoria a year ago to become medical director of the Victoria T.B. Unit. He graduated from Queen's University, Kingston, Ont., in 1926, practised a year in this city, and then went to Tranquille.

Dr. Jones is survived by his widow, two daughters and one son.

Dr. John Norris McDonald died on April 18 at his residence in Halifax. He was born in Shelburne, December 13, 1879. Dr. McDonald attended Shelburne High School and the Normal School, Truro, and graduated in medicine from McGill University, receiving his M.D.C.M. in 1908. He interned for one year at the Royal Victoria Hospital, Montreal, after which he went to Curling, Newfoundland, and later to St. Johns, Quebec. In 1930 he returned to Halifax. Although in ill-health for the past nine years, he had carried on his practice up to a few months ago. Dr. McDonald was a man of sterling qualities with a keen and accurate mind, and held the confidence of all who knew him. Surviving is his widow.

Dr. Lawrence McCheyne Murray, who had practised medicine for 20 years in Toronto, died April 23 after a brief illness. He was a veteran of the First Great

He was a life-long resident of Toronto. Dr. Murray attended Model School and Jarvis Collegiate. He interrupted his medical studies to enlist in the First Great War and served overseas with the 15th Battalion, 48th Highlanders. He graduated from the University of Toronto in 1923. In his student days he was quarter back of the University rugby team, which won the Dominion Championship in 1920. For some years Dr. Murray was a member of the staff of the Hospital for Sick Children. He was an active member and elder of Runnymede United Church.

Surviving are his widow, a daughter, a son and a brother.

Dr. J. P. Roger died on March 11, 1946, in Orillia. He was born January 5, 1864, on a half-cleared farm in Perth county, eight miles from St. Mary's. He attended St. Mary's collegiate for two years, working as chore boy for Dr. Irving, who found him a capable assistant in emergencies and made him an apprentice. He entered Trinity Medical School in Toronto in the fall of 1884, and graduated in 1888.

In 1889, Dr. A. Groves of Fergus, took him into

In 1889, Dr. A. Groves of Fergus, took him into a partnership which lasted eight years. They performed the first appendix operation in America, boiled instruments and pioneered in many ways. In 1897, Dr. Groves sold the practice to Dr. Roger.

Dr. Roger was fond of sport. Curling and baseball

Dr. Roger was fond of sport. Curling and baseball were his favorites while in Fergus but he took a keen interested in lacrosse. In politics, he was a Liberal. He took an active part in church and Sunday school work in Melville Presbyterian church and was elected an elder at an early age. He became clerk of session, and when the new Melville church was built in 1900, he was on the building committee.

Dr. Roger left Fergus in 1906 to work as medical superintendent at a farm school in North Carolina. During the first World War, he returned to Canada and enlisted but was asked to use his knowledge of farming and dairying instead of going into the armed services. Until the end of the war, he managed his farm on the outskirts of Fergus, producing food and flax.

After the war, he practised again in Whitby, Sudbury and Massey; then as company doctor at Cutler, Spanish Mills, Worthington and Grason. In 1930, he went to Coldwater, and from 1936 to within a month of his death, he assisted Dr. P. B. Rynard in Orillia.

Dr. J. Franklin Stonness, aged 52, died recently at his home in Flushing. He received his degree of B.A. and M.D. at Queen's University. Dr. Stonness was a general practitioner at Sharbot Lake and Vars, Ontario, for several years and then went to Post Graduate Hospital, Manhattan for special training. He had offices in Manhattan and Flushing for more than 15 years. During the second Great War he was an examining physician with the selective boards in Flushing and Bayside. He was a member of the New York State Medical Society.

Surviving are his widow, a daughter, three brothers and two sisters.

Dr. Edmund A. Taggart, a native of Shawville, died at a local hospital April 11, in his 68th year. He took ill several months ago while in Ottawa.

Dr. Taggart came to Ottawa from Shawville as a youth and following his graduation from Lisgar Collegiate, attended McGill University where he obtained his doctor's degree in medicine. After several years of practice in Ottawa, he went to New York city for further study and later joined the staff of the Manhattan State Hospital. He retired seven years ago, and has since spent much of his time in the Capital. He never married.

To lose one's health renders science null, art inglorious, strength effortless, wealth useless, and eloquence powerless.—Herophilus.

NEWS ITEMS

Alberta

Dr. J. D. Heaslip of Guelph, Ontario, recently appointed full-time Superintendant of the Calgary General Hospital assumed this position on May 1, 1946.

The establishment of the Calgary "rural" municipal hospital district covering a large portion of the rural area and several towns and villages around Calgary was announced on May 2, 1946, by the Provincial Department of Health. A provisional board will be appointed which will proceed with organizing the district. Construction of a hospital in Calgary, or any other arrangement for providing hospital services for the people of the district will then be proceeded with.

The many friends of Dr. W. H. McGuffiin, of Calgary, were pleased to hear of the well merited honour recently conferred on him by his alma mater the University of Western Ontario. At the annual convocation held in London, Ontario, on March 27, 1946, the honorary degree of Doctor of Laws was conferred on him. Dr. McGuffin was a pioneer in radiology in this Province and has held high offices in radiological societies in both the United States and Canada.

At the annual meeting of the Alberta Tuberculosis Association held recently in Calgary, an expansion of activities in this Province was decided on. A full-time director has been appointed and new equipment will be added to the two mobile units to speed up the x-ray rate, and Province wide surveys will be organized in the greatly extended free chest x-ray service to determine the presence of tuberculosis among residents of this Province.

G. E. LEARMONTH

Manitoba

Dr. I. O. Fryer, deputy provincial coroner since 1942, has been appointed provincial coroner in succession to the late Dr. W. R. Gorrell.

The report on venereal diseases tabled in the provincial legislature by Hon. Ivan Schultz, Minister of Health and Public Welfare, proposes two new pieces of legislature. One will enforce pre-marital blood tests. the other would give the provincial government power to suspend or cancel the licenses of boarding premises which contribute to the spread of venereal disease.

As a sign that the war is really over, The Winnipeg Medical Golf Club, dormant for several years, held a reorganization meeting on April 8.

The directors of the Brandon General Hospital are considering ways of increasing the capacity of the hospital.

At a public meeting in Selkirk on April 4, Miss Margaret Nix of the Department of Health and Public Welfare, discussed the new health centre to be located there. It will serve St. Andrews, St. Clements, Brokenhead and Selkirk districts and will cost \$27,731.00 or approximately \$1.00 per person per year. Two-thirds of the cost will be assumed by the government, the remaining third by the municipalities.

Dr. C. W. Burns of Winnipeg spoke at the annual meeting of the North Dakota Medical Association at Grand Forks, March 20, on "Surgical conditions of the colon".

The Licensed Practical Nurses Act provides for a standard fee for services performed by practical nurses. The fee is \$3.60 for an eight-hour day, or \$5.00 for a twenty-hour day where the nurse sleeps in the home and is on call except for four hours free time. She

will be paid \$2.00 for four hours evening duty, and overtime will be paid for at 45 cents an hour.

At a meeting of the Winnipeg Medical Society on April 26, Major H. S. Atkinson, R.C.A.M.C., loaned to the Medical Museum three articles which he had collected in England. They were a mahogany portable medicine case of the mid-Victorian era, a brass phlebotomy set and a Chinese opium cooker in cloisonné enamel. Dr. E. S. James spoke on "Cervical intravertebral discs", prolapse of which could cause brachial neuritis. Dr. A. E. Childe discussed the radiology of this condition. Dr. G. C. Stevens gave case histories of four children seen in the Children's Hospital in whom unfavourable environment was responsible for severe behaviour problems and psychosomatic disease. Fourteen new members of the Society were welcomed.

Dr. P. H. T. Thorlakson, President of the Board of Governors of the Manitoba Medical Centre, addressed the Manitoba Music Teachers' Association on the Medical Centre. He stated that the City of Winnipeg is preparing to underwrite a bond issue of \$650,000 towards the construction of a 150-bed maternity hospital in the medical centre area, and contrasted with this is the failure of the provincial government to give any financial support. The purpose of the Manitoba Medical Centre project is to provide this province with a medical, hospital and research centre offering the necessary facilities for undergraduate and postgraduate teaching and training of medical, nursing and technical personnel.

The Winnipeg civic finance committee on April 26 recommended the gift of four city lots on the north side of Notre Dame Avenue between Pearl and Emily Streets, as a site for the 150-bed maternity hospital. The committee also approved an immediate grant of \$25,000 for the Winnipeg General Hospital to cover operation costs.

At March 31, 1946, Manitoba Medical Service had a total of 29,748 enrolled under its two plans. The financial situation has improved. Mr. A. E. Johnston, K.C., and Mr. Gordon Lawson have been added to the Board.

A division of neuropsychiatry has been organized within the Department of Medicine in the Winnipeg General *Hospital. The honorary physicians in this division are Dr. G. L. Adamson, Dr. T. A. Pincock, Dr. A. T. Mathers and Dr. George Little. Ross MITCHELL

New Brunswick

Dr. A. M. Sormany and Dr. P. C. Laporte, M.B.E., of Edmonton are holidaying in Mexico. The excursion is under the auspices of the *Journal L'Action Catholique* and the Canadian National Railways.

Dr. D. J. Tonning of Saint John has completed a special course in internal medicine at various Boston Hospitals.

Dr. T. S. Dougan of Sussex was taken suddenly ill while attending Cook County Graduate School of Medicine in Chicago. He has now returned home but is still unable to completely resume his practice.

Dr. L. DeV. Chipman is leaving Saint John to reside in Wolfville, N.S. His colleagues in Saint John presented him with a painting by Jack Humphrey as a memento of his many years' service in the community.

The New Brunswick representation at the Annual Meeting of the C.M.A. at Banff this year will be somewhat limited by the shortage of accommodation available.

Dr. George Keddy was the special speaker at the meeting of the Saint John Medical Society, May 1. His subject—"War surgery". A. S. KIRKLAND

Nova Scotia

A very pleasing part of the annual meeting of the Halifax Medical Society held on April 24 was the presentation to Dr. H. K. MacDonald, of Halifax, of a gold watch, suitably engraved, on the occasion of his 50th anniversary in the medical profession.

Dr. MacDonald graduated from McGill University in the class of 1896 and, after practising in Lunenburg for several years, came to Halifax where he soon became attached to the teaching staff of Dalhousie University and a member of the Surgical Staff of the Victoria General Hospital. After being senior surgeon in the latter institution for fourteen years, he recently retired from Active to the Consulting staff. At present he is Professor of Surgery and Head of that Department at Dalhousie University. For many years he has been actively interested in the work of the Canadian Medical Association, the Royal College of Physicians and Surgeons of Canada, and of the Medical Council of Canada.

The presentation was made by Dr. N. H. Gosse, President of the Society. Personal friends of many years' standing who spoke as representing various groups in which Dr. MacDonald had an interest and at the same time attesting their personal regards were Drs. G. H. Murphy, C. S. Morton, J. G. MacDougall, J. J. MacRitchie and H. G. Grant; also two of his associates, Drs. V. O. Mader and M. G. Burris; as well as Drs. R. E. Mathers and S. R. Johnston, close friends of many years in Halifax.

Dr. J. B. Reid, Jr., of Truro, has recently been discharged from the Services and is associating himself in practice with his father.

Due to a scarcity of suitably trained nurses the City Infectious Diseases Hospital in Halifax has been forced to temporarily limit its bed accommodation. The same factor may prevent the early opening of the new wing of the City Tuberculosis Hospital. It is hoped that this shortage will be only of a temporary nature.

H. L. SCAMMELL

Ontario

The London Academy of Medicine entertained the Hamilton Academy, on April 24. The visitors provided the program and the hosts gave the dinner at the Hunt and Country Club, so both were well rewarded. Dr. E. C. Janes read a paper on "Some surgical conditions of the chest other than tuberculosis" and Dr. F. Basil Bowman, spoke on "Problems of therapy in skin conditions".

On April 24, district No. 6 of the Ontario Medical Association, held its annual meeting in Lindsay. In the morning session, Dr. L. W. Thompson of Peterborough, gave an illustrated lecture on "Points in diagnosis and treatment of diseases of the chest". Dr. R. McLennon, radiologist Ross Memorial Hospital, Lindsay, led a conference on x-ray diagnosis. In the afternoon Dr. H. A. Dixon of Toronto, discussed "Common skin conditions; diagnosis and treatment" using lantern slides. Dr. F. I. Lewis of Toronto, discussed "The modern treatment of peptic ulcer". At luncheon Dr. A. D. Kelly was guest speaker and addressed a full gathering of the medical men of the district.

M. H. V. Cameron

Prince Edward Island

Dr. R. G. Lea, has joined the staff of the Polyclinic, Charlottetown, a son of the late Walter Lea, who was Liberal Premier for a number of years. Dr. Lea graduated from Dalhousie University in 1938, for two years he was senior intern in Internal Medicine at the Toronto General Hospital; then proceeded overseas as medical consultant to No. 7 General Hospital. Since returning from overseas Dr. Lea has taken a postgraduate course in Toronto.

Among the recent graduates from the Faculty of Medicine of Queen's University, Kingston, Ont., was Clarence Coady of Hazelbrook, Prince Edward Island. Dr. Coady will intern at the Ottawa Civic Hospital.

Seven thousand nine hundred and seventy-seven persons have been x-rayed in Charlottetown during the first two weeks in April, by the Mobile X-ray Unit. Included among this number is practically 100% of the city's school population.

Dr. Clair Tanton, son of Dr. and Mrs. E. T. Tanton, Summerside, has returned to his home after serving three years in various navy hospitals in Canada and Newfoundland. Dr. Tanton received his discharge in February and intends to remain in Summerside.

Dr. J. R. Corbett, Summerside, is in New York taking a course in surgery.

Dr. Benjamin Tanton, son of Dr. and 'Mrs. E. T. Tanton, Summerside, is now practising in Vancouver as an eye, ear, nose and throat specialist.

An added stimulus to the V.D. Control Organization has been the recent appointment of Dr. Harold Shaw as Provincial Pathologist and Director of Provincial Laboratories. Recently this organization's name was changed to that of 'The Social Hygiene Council of Prince Edward Island''. Dr. W. J. P. McMillan, O.B.E., is president of this council; Dr. J. A. McMillan, chairman of the Health Committee; Dr. B. C. Keeping, Chief Health Officer, and Dr. J. H. Shaw, Director of Provincial Laboratories, outlined the salient features of a proposed bill which would require a health examination previous to marriage. The Council approved this measure, which has since become law.

At the present time a drive is on to secure members for the Cancer Society and to awaken interest in the early recognition and treatment of this dreaded disease. Dr. W. B. Howatt, radiologist, Summerside, recently addressed the Rotary Club of that town. In Charlottetown, Dr. J. H. Shaw, Provincial Pathologist, addressed the Y Men's Club, and Dr. W. L. Macdonald, radiologist, the Rotarians, in the interest of the Prince Edward Island Cancer Drive.

Dr. W. A. Shea is now practising in Alberton. After serving in Canada and overseas with the Canadian Army, Dr. Shea received his discharge in February, 1946.

At Winnipeg on April 17, 1946, to Surgeon-Lieutenant and Mrs. W. W. Tidmarsh, a son, William Gordon. Surgeon-Lieutenant Tidmarsh is a son of Dr. F. W. Tidmarsh, Charlottetown, who recently retired from the Polyclinic after many years of appreciated service.

A most enjoyable dinner was held at the Charlotte-town Hotel Saturday evening, April 20, sponsored by the Educational Committee of the Prince Edward Island Medical Society. Over thirty doctors from various parts of the Island were present in spite of the inclement weather and adverse road conditions. Dr. Leo Farmer, President of the Society presided. Dr. J. C. Houston, Chairman of the Committee deserves and has received much praise for his untiring efforts in fostering these dinners. Following a good old fashioned singsong, brief discussions relative to V.D. Control and Medical Economics were in order. The speaker for the evening was Dr. B. G. Lea, who gave a very interesting and detailed account of his experiences as medical consultant to No. 7 General Hospital in England and on the Continent.

Quebec

Les 6, 7, 8 et 9 mai avaient lieu à l'hôtel Windsor les Journées médicales annuelles de la Société Médicale de Montréal. Les principaux sujets traités furent l'ulcus gastro-duodénal, le diabète, le B.C.G. et les maladies estivales.

A sa séance du 19 mars dernier, la Société Médicale de Montréal a exprimé le vœu de la création d'une chaire d'anesthésie à l'Université de Montréal.

A la séance du 18 mars 1946 du bureau médical de l'hôpital Notre-Dame, l'exécutif suivant a été élu: président: Paul Bourgeois; vice-président: Georges Hébert; secrétaire: Esdras Autotte; secrétaire des séances: Armand Gratton; bibliothécaire: Emile Ménard; représentant du Bureau au Conseil d'administration: Charles Hébert, Arthur Magnan et Donatien Marion.

Le docteur Albini Paquette, ministre de la Santé et du Bien-Etre social, a déclaré récemment à une délégation de Maisonneuve, dirigée par le docteur J.-F.-A. Gatien, député du comté, que le gouvernement provincial dotera l'est de la ville de Montréal d'un hôpital de 600 lits, au coût d'environ \$3,000,000.

Le docteur Pierre Jobin, professeur à l'Université Laval de Québec, a été choisi comme délégué de la Fédération Canadienne des Universités Catholiques au deuxième congrès inter-américain de Pax Romana, tenu, à Lima, Pérou, du 10 au 19 mars 1946.

On vient de commencer, à Gaspé, la construction d'un sanatorium dont le coût atteindra un million de dollars et qui sera prêt dans deux ans.

Ce sanatorium est érigé à l'intention des tuberculeux

de la Gaspésie et des régions avoisinantes. Le colonel Pierre Tremblay vient d'être nomme médecin en chef du district militaire No. 5.

Récemment a été tenue, à Québec, au Château Frontenac, une réunion de délégués des principaux bureaux médicaux des hôpitaux de la province de Québec.

Lors de cette réunion, un comité provisoire a été constitué en vue d'élaborer les règlements et la mise sur pied de la nouvelle association. Le président de ce comité provisoire est le docteur Roland Décarie, chirurgien de l'hôpital Notre-Dame.

Le docteur Gérard Rolland, chirurgien à l'hôpital du Sacré-Cœur, vient d'être nommé chef adjoint du service de chirurgie thoracique.

JEAN SAUCIER

Quebec May Vote \$10,000,000 to Fight Tuberculosis.—If the bill which the Quebec Minister of Health, the Hon. Albiny Paquette, has introduced in the Legislature goes through, as it seems likely to do, having received its first reading, this province will spend some \$10,000,000 to fight tuberculosis.

The bill, in several brief paragraphs, best tells its own story. After laying down the principle that it is urgent and of vital importance for the public health and the protection of human capital to undertake a vigorous fight against the scourge of tuberculosis, it is enacted:

1. The government is authorized to adopt the measures it shall deem expedient to combat tuberculosis and more particularly it may, upon the recommendation of the Minister of Health, organize the detection of cases of tuberculosis, contribute to the cost of the enlargement, construction and equipment of sanatoria for consumptives, bear the costs of the hospitalization of indigent consumptives, the training of specialists in the treatment of such disease and anti-tuberculosis educational campaigns, and generally adopt any other proper method of securing the success of the fight against tuberculosis.

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2. The government is authorized to spend for such purposes, out of the consolidated revenue fund, in the manner, upon the conditions and at the time it shall deem expedient, during a period of not more than four years, as from the coming into force of this act, a sum not exceeding ten million dollars.

3. The lieutenant-governor-in-council may authorize the Minister of Health to enter into any agreement he shall deem expedient with governments, corporations, societies and persons for attaining the purposes

contemplated in this Act.

4. An advisory board is constituted with the function of suggesting measures to combat tuberculosis and ensure a practical and efficient carrying out of this

act.

The said board shall be composed of five members, three of whom shall be physicians, appointed by the lieutenant-governor-in-council, who shall determine the fees and expenses to be paid to them for their attending the meetings of such board. Such fees and such expenses shall be paid out of the fund created by this act.

5. The lieutenant-governor-in-council is authorized to appoint a person as director general of the fight against tuberculosis and to fix his salary which shall not be over \$10,000 per annum and shall be paid out

of the consolidated revenue fund.

6. All the orders-in-council passed under this act shall be deposited at once with the Legislative Assembly, if it is then in session; if not, they shall be so deposited within the first thirty days of the subsequent session.

7. The carrying out of this act is entrusted to the

Minister of Health.

This act shall come into force on the day of its sanction.

General

Retirement of Col. C. H. L. Sharman .- The retirement of Colonel C. H. L. Sharman, C.M.G., C.B.E., of Ottawa, after 48 years in government service, has been announced.

Since 1927, Colonel Sharman has been chief of the narcotic division of this department. K. C. Hossick, assistant head of the division since 1928, has been named acting chief. In 1931 and 1936, Colonel Sharman was one of Canada's delegates in negotiating international agreements relating to narcotics and since 1934 has been Canadian representative on the League of Nations' advisory committee on the traffic in opium and other dangerous drugs. Arrangements have been made for him to represent Canada on the narcotic drug commission established under the Economic and Social Council of the United Nations.

In what is believed to be a unique tribute from the officials of one country to a colleague in another government service, officers of the United States Bureau of Narcotics have presented Colonel Sharman with a watch in appreciation of his very great help under many trying circumstances. In requesting the Canadian ambassador in Washington to transmit the gift, the Hon. H. J. Anslinger, United States commissioner of narcotics, said that "we have always highly respected Colonel Sharman's valuable counsel and have benefited by his unfailing devotion to difficult tasks which have con-fronted both services".

Prime Minister King, in forwarding the gift, said that Colonel Sharman had been a tower of strength in narcotic enforcement and paid tribute to his distinctive service on international commissions and to his extra-ordinary record of public service.

Colonel Sharman, who was born and educated in England, came to western Canada in 1898 where he joined the North West Mounted Police. During the Yukon gold rush he served in Dawson City and later spent some years on the prairies. Late in 1903 he came to Ottawa to join the newly-organized health of animals branch of the federal Department of Agriculture with which he remained until 1927 when he transferred to the Department of National Health.

He served in the South African War and, after coming to Ottawa, with the Canadian militia. In 1914 he took command of the First "Ottawa" Battery, Canadian Artillery, overseas and was wounded at the second battle of Ypres. Later he commanded a brigade of artillery on the expedition sent to Archangel. distinguished wartime services he was made a Companion of the Order of St. Michael and St. George, a Commander of the Order of the British Empire and received the Order of St. Vladimir from the Russian government.

The American Congress of Physical Medicine will hold its twenty-fourth annual scientific and clinical session September 4, 5, 6 and 7, inclusive, at the Hotel Pennsylvania in New York. Scientific and clinical sessions will be given each day. All sessions will be open to members of the medical profession in good standing with the American Medical Association. In addition to the scientific sessions, the annual instruction courses will be held September 4, 5, and 6. These courses will be open to physicians and to therapists registered with the American Registry of Physical Therapy Technicians. For information concerning the convention and the instruction course, address the American Congress of Physical Medicine, 30 North Michigan Avenue, Chicago 2, Illinois.

International College of Surgeons.—More than 2,000 surgeons and other doctors of medicine are expected to attend the three-day Assembly of the United States Chapter, International College of Surgeons in Detroit, October 21, 22, 23. Among the principal speakers to be heard in Detroit's Masonic Temple will be Mr. ne neard in Detroit's Masonic Temple will be Mr. Hamilton Bailey, of London, England; Dr. Francisco Grana, of Peru; Dr. Felipe F. Carranza, of Argentina; Dr. Manuel Manzanilla, of Mexico; Dr. Wayne W. Babcock, of Philadelphia, and many other leading surgeons of the United States.

Detailed information and copy of the program may be obtained by writing L. J. Gariepy, M.D., 16401 River Avenue, Detroit 27, Michigan.

The Jacob Bigelow Medal.—The Boston Surgical Society awarded their Henry Jacob Bigelow Medal to Dr. Frank H. Lahey on May 10, 1946. Dr. Lahey gave an address on "Surgery of the thyroid" following which he was presented with the Bigelow Medal by the president of the Society, Dr. Donald Munro.

1946 Lasker Award.—The Lasker Award, presented annually for outstanding service in the field of mental hygiene, will be given this year for the most significant experimental investigation into behaviour deviation. Nominations with supporting data, which will be presented to an anonymous jury chosen for its competence to judge accomplishment in the field selected, are now being accepted by the National Committee for Mental Hygiene, New York. The work of the candidate must either have been accomplished or have been tested and won general acceptance, approximately within the past year. Presentation of the \$1,000 award is made each fall at the annual meeting of the Committee, which will be held this year on October 30 and 31, at the Hotel Pennsylvania.

1945, the award was conferred jointly on Dr. Tn John Rawlings Rees, Consultant in Psychiatry to the Directorate of Psychiatry of the British Army, and Major General G. Brock Chisholm, Deputy Minister of National Health, Federal Department of National Health and Welfare, Canada, for outstanding service in subshibitation.

in rehabilitation.

The Passano Foundation Award. - Dr. Ernest W. Goodpasture, Professor of Pathology and Dean of the School of Medicine of Vanderbilt University, Nash-ville, Tennessee, is the 1946 recipient of the Passano Foundation Award. Presentation of the \$5,000 cash award was made at an appropriate ceremony in historic Osler Hall of the Medical and Chirurgical Faculty of Maryland, in Baltimore, on the night of May 15.

SODIUM PENICILLIN - CONNAUGHT



SODIUM PENICILLIN is supplied by the Connaught Medical Research Laboratories in sealed rubber-stoppered vials as a dry powder which remains stable for at least a year if stored at a temperature below 10° C. (50° F.). SODIUM PENICILLIN is available from the Laboratories in vials containing 100,000 International Units and in vials containing 200,000 International Units.

PHYSIOLOGICAL SALINE, sterile and pyrogen-free, is supplied in 20-cc. rubber-stoppered vials, permitting of the convenient preparation of various dilutions of penicillin.

As supplied by the Connaught Medical Research Laboratories, Sodium Penicillin is of high quality and is free from irritating substances.

CONNAUGHT MEDICAL RESEARCH LABORATORIES
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The Foundation, which was established in 1944 by the Williams and Wilkins Company, Medical Publishers, of Baltimore, proposes to aid in any way possible the advancement of medical research, especially research that bears promise of clinical application. For the encouragement of such research the Foundation has established the award as one of its activities.

Dr. Goodpasture receives the award for his original development of the method for propagation of viruses in pure culture by inoculation of chick embryos and for his outstanding contributions to advancement of knowledge of the cell-parasite relationship in bacterial and virus infection.

(a) Postgraduate Research Fellowships. — Fellowships made available by the Life Insurance Medical Research Fund are open to residents of the United States and Canada who possess an M.D. or Ph.D. degree or the equivalent. Holders are expected to devote full-time to research. For the present, preference will be given to those who wish to work on fundamental problems broadly related to cardiovascular function and disease

The annual stipend varies, but as a rule is between \$2,500 and \$3,000. Larger amounts may be granted in individual instances for special reasons. Fellowships are granted for one year, but may be renewed for one or two years.

(b) Student Research Fellowships.—Fellowships made available by the Life Insurance Medical Research Fund are open to residents of the United States and Canada who have completed at least one year of medical school, but who are not experienced investigators. Holders are expected to devote at least three-quarters of their time to research under the direction of an experienced investigator. For the present, preference will be given to those who wish to work on fundamental problems broadly related to cardiovascular function and disease. Students will necessarily spend an extra year in obtaining the M.D. degree.

in obtaining the M.D. degree.

The annual stipend varies, but as a rule is between \$1,500 and \$2,000. Fellowships are granted for one year.

Apply to Dr. Francis R. Dieuaide, Scientific Director, Life Insurance Medical Research Fund, 333 Cedar Street, New Haven 11, Connecticut.

We have received the first number of The Journal of the American Medical Women's Association. Its object is to establish a representative organ for reporting the best type of work by women in medicine. Scientific articles from other members of the profession may also be submitted. It will be a means of correlating the various activities of one section of the country with another, as well as creating an interrelation with medical women in foreign fields.

Addresses Wanted.—Will Dr. Walter Riddell and Dr. Robert Stuart Reid, please communicate with the office of the Canadian Medical Association, 135 St. Clair Avenue West, Toronto 5, Ontario, giving their present addresses in order that mail from Edinburgh, Scotland, may be forwarded to them.

The American Pharmaceutical Manufacturers' Association is to hold a joint session with the Canadian Pharmaceutical Manufacturers' Association at Lake Louise June 10 to 12. This is the first occasion on which the A.P.M.A. has held its annual convention on Canadian soil, and opportunity will be made to celebrate the event at the inspection of the medical exhibit of the Canadian Medical Association on the evening of June 10, when there will be welcoming speeches by the Canadian Medical Association with responses by the A.P.M.A. followed by refreshments.

Canadian Physicians' Fine Art and Camera Salon.—A change has been made in the entry regulations for the Canadian Physicians' Fine Art and Camera Salon.

Art pieces up to thirty (30) inches in the longer dimension will now be accepted for judgment in the Salon. This change, the request of a number of interested physicians, has been made possible as a result of the obtaining of the Banff School Auditorium as a place of exhibition; and the Sponsors of the Salon, Frank W. Horner Limited, are pleased to announce that the larger exposition place will permit the showing of larger pictures.

BOOK REVIEWS

Chemistry of Anæsthesia. J. Adriani, Director, Department of Anæsthesia, Charity Hospital of Louisiana of New Orleans. 536 pp., illust. \$9.00. Charles C. Thomas, Springfield, Illinois; Ryerson Press, Toronto, 1946.

This textbook of chemistry deals with inorganic chemistry, organic chemistry and biochemistry in their relation to anæsthesia. It treats with each of these in a practical manner that is readily understandable by the average anæsthetist and should make for a much more intelligent administration of anæsthetic drugs as a result of increased knowledge of their composition and qualities.

The book is handsomely printed and bound and is of convenient size for holding. The illustrations and charts are clear and interpretive and there is a generous bibliography and glossary. This is a book which along with its companion volume, The Pharmacology of Anxithetic Drugs, should be on the shelf of every practising anæsthetist both for reference and for stimulating study.

Extensile Exposure Applied to Limb Surgery. A. K. Henry, Emeritus Professor of Clinical Surgery in the University of Egypt. 180 pp., illust. \$9.00. E. & S. Livingstone Ltd., Edinburgh; Macmillan Co. of Canada, Toronto, 1945.

Professor Henry's new book is a notable contribution to the Art of Surgery. It would be difficult to conceive of a better example of the application of anatomy to the practice of surgery. He describes in detail the steps necessary to expose every nook and cranny of the extremities; even more important he reduces the problem of surgical exposure to basic principles, soundly conceived and clearly stated.

reduces the problem of surgical exposure to basic principles, soundly conceived and clearly stated.

The book deals with surgical problems of great importance and this alone would give it claim to distinction and justify its acceptance. But in addition it is written in such clear and forceful English, enlivened by apt quotation and simile, as to make its reading a delight and its assimilation an easy and pleasant task. The illustrations are excellent and add greatly to the value of the book.

No surgeon who deals with extremity problems can afford to be without this monograph, and it should be in the library of all teaching hospitals and universities. It is of great practical value to advanced students in surgery.

Introduction to Clinical Surgery. C. F. M. Saint, Professor of Surgery, University of Cape Town. 304 pp. 25s. The African Bookman, Cape Town, 1945.

The book was written primarily for the author's students and dressers; it is essentially clinical and not a textbook on surgery. Exception is taken to some of the statements such as "Carcinoma of the rectum—80% inoperable". This is at variance with findings on the American Continent, which about reverses these figures.

Many of the facts outlined are not well correlated, and there is some repetition, but on the whole the book makes interesting reading, particularly for a graduate student. It is a practical man's approach to surgery, a sound teaching method of imparting knowledge by reasoned thinking. The chapters on appendicitis and abdominal emergencies are excellent.

